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THE

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone; No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

CITY OF BIRMINGHAM.

TRAMWAYS DEPARTMENT.

The Tramways Committee are prepared to receive tenders for the supply of Stores as set forth in the following Schedules, during the year ending March 31, 1915:—

Schedule No.
1 Glass.
2 Iron and Steel.
3 Leather and Rubber Goods.
4 Cotton Waste, White Rags, and Sponges.
5 Paint, Varnishes, etc.
6 Springs.
7 Electrical Sundries.
8 Oils, Greases, etc.
9 Chemist's Sundries.
10 Iron and Steel Castings.
11 Malleable Iron Castings.
12 Insulating Materials.
13 Paint and other Brushes.
14 Files.
15 Ironmongery.
16 Bolts and Nuts, Washers, etc.

Conditions of contract and form of tender may be obtained on application to the undersigned.

The tender, filled up as directed, must be enclosed in a sealed cover, addressed to the Chairman of the Tramways Committee, and endorsed in the left-hand corner, and delivered to the Tramways Offices, The Council House, Congreve Street, Birmingham, not later than 12 o'clock noon on Monday, the 26th day of January, 1914.

ALFRED BAKER,
General Manager.

Tramways Offices,
The Council House,
Congreve Street, Birmingham.

CITY AND ROYAL BURGH OF DUNDEE.

ELECTRICITY DEPARTMENT.

The Corporation invite tenders for the supply, delivery, and erection of the following:—

Section A.—5,000 kw. Steam Turbine and Alternator.
Section B.—Condensing Plant.
Section C.—750 kw. Rotary Converter, with Transformer.

Specification, drawings, form of tender, and general conditions of contract may be obtained from the undersigned on the payment of one guinea, which will be returned on receipt of a *bonâ-fide* tender. No tenders in which any alteration has been made in the general conditions will be considered.

Tenders, sealed in envelopes provided, to be lodged with W. H. Blyth Martin, Esq., Town Clerk, City Chambers, Dundee, not later than by first post on Friday, January 30, 1914.

The Town Council do not bind themselves to accept the lowest or any tender, and each section will be regarded as a separate contract.

H. RICHARDSON, M.Inst.E.E.,
General Manager and Engineer.

Electricity Department, Dundee,
December 29, 1913.

CORPORATION OF IPSWICH.

ELECTRIC SUPPLY DEPARTMENT.

Tenders are invited for the following:—

Specification No. 69.

Section A.—Three-phase 300 k.v.a. 3,300 Volt Alternator to Couple to Existing Engine.

Rotary Converter with Transformer, A.C. Booster, and C.C. Exciter to give 312 k.v.a. from C.C. to A.C.

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Section B.—Three 50 k.v.a. Three-phase Transformers for Sub-station.

Section C.—H.T. Three-phase Main Switchboard for Power Station.

Section D.—H.T. and L.T. Switchgear for Sub-stations.

Section E.—Two Motor or Rotary Converters, each 250 kw.

Copies of the specification, general conditions of contract, and drawings can be obtained from the undersigned upon payment of £1, which will be refunded upon receipt of a *bonâ-fide* tender.

Contractors are at liberty to tender for any one or more sections or for all. Tenders are to be delivered to the undersigned not later than 11 a.m. on Saturday, January 31, 1914.

The Corporation does not bind itself to accept the lowest or any tender.

F. AYTON, M.I.E.E.,
Chief Engineer and Manager.

December 30, 1913.

THE MADRAS AND SOUTHERN MAHRATTA RAILWAY COMPANY, LTD.

The Directors are prepared to receive tenders for:—

(1) About 2,000 Tons Steel Sleepers and Fittings;
(2) About 820 Tons Bearing Plates;
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in accordance with the specifications, which may be seen at the offices of the Company. The charge for each specification is one guinea, which will not be returned.

Tenders must be sent in, addressed to the Secretary, not later than 2 p.m. on Friday, January 9, 1914, marked "Tender for Sleepers," or as the case may be.

The Directors do not bind themselves to accept the lowest or any tender.

H. BONHAM-CARTER,
Secretary.

Company's Offices,
91, York Street, Westminster, S.W.,
December 22, 1913.

CITY OF MANCHESTER.

The Electricity Committee of the Manchester Corporation invite tenders for the construction, delivery, and erection at their Stuart Street Generating Station of

Water Coolers.

Specifications and forms of tender may be obtained on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester, on payment of a fee of one guinea, which amount will be refunded on receipt of a *bonâ-fide* tender.

Further particulars and information can be obtained from Mr. S. L. Pearce, Chief Electrical Engineer, Dickinson Street, Manchester.

Tenders, duly endorsed and addressed to the Chairman of the Electricity Committee, must be delivered at the Town Hall not later than 10 a.m. on Friday, January 16, 1914.

The Corporation do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester,
December 29, 1913.

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MANCHESTER CORPORATION TRAMWAYS.

The Tramways Committee of the Manchester Corporation are prepared to receive tenders for the supply and delivery of the following, viz.:—

(a) Tramcar Trucks.
(b) Motors and Controllers for Tramcars

Specifications and forms of tender may be obtained on application to Mr. J. M. McElroy, General Manager, Corporation Tramways, 55, Piccadilly, Manchester.

Tenders are to be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, and must be received not later than 10 a.m. on Tuesday, January 20, 1914.

The Committee do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON.
Town Clerk.

Town Hall, Manchester,
January 2, 1914.

COUNTY BOROUGH OF WOLVERHAMPTON.

ELECTRICITY DEPARTMENT.

Tenders are invited for the supply, delivery, and erection of :—

Two Water-Tube Boilers Complete with Superheaters and Mechanical Stokers.

Specification and form of tender may be obtained from the undersigned on payment of one guinea, which will be returned on receipt of a *bonâ-fide* tender. Extra copies may be obtained upon payment of 5s. for each copy.

Tenders, addressed to the Chairman of the Electricity Committee, Town Hall, Wolverhampton, must be sealed with wax and endorsed "Tender for Boilers," and delivered not later than noon on Monday, January 19, 1914.

The lowest or any tender will not necessarily be accepted.

S. T. ALLEN,
Chief Engineer and General Manager.

AUCKLAND HARBOUR BOARD, AUCKLAND, NEW ZEALAND.

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COUNTY BOROUGH OF SALFORD.

Tenders required by noon, January 12, 1914, for the supply, delivery, and erection of three-phase Extra High Pressure and Medium Pressure Switchgear, also for the supply, delivery, and erection of two 300 k.v.a. Three-Phase Power Transformers.

Specifications, etc., from the Borough Electrical Engineer, Electricity Works, Frederick Road, Pendleton, Salford.

(*Continued on page 7.*)

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BRITISH ISLES. W. C. Knight, 75, Surrey Street, Sheffield. Wm. C. Yuille & Co., 60, Brown St., Anderston, Glasgow. Equipment & Supplies, Ltd., 7, Anglesea Street, Dublin.
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AUSTRALIA. H. A. E. Rothwell, Cromwell Buildings, Bourke Street, Melbourne, Victoria.
NEW ZEALAND. James Jackson, Box 731, G.P.O., Wellington.
JAPAN. W. M. Rooke & Co., 184, 5 Chome, Nakanoshima, Osaka.

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THE
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SATURDAY, JANUARY 3, 1914.

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HEAD OFFICE:

MOORGATE STREET, LONDON, E.C.

THE END OF THE LEEDS STRIKE.

The strike of municipal employees in Leeds, which began on December 10, is now in its last stages, and by the time these lines are in the hands of readers it will probably be at an end so far as the Corporation and the general public of Leeds are concerned. During the past week gasworkers and other employees continued to return to work despite the strenuous advice of local labour leaders, and the process of engaging new men to take the place of those remaining on strike went steadily on. It is to be feared that a large number of misguided employees will find when they do want to go back that their places have been permanently filled. The demand for a general advance of 2s. per day is dead, while the syndicalist plot to paralyse the communal activities of our large towns has received a heavy blow. The Corporation and the citizens of Leeds are to be congratulated on the firm stand which they made against a conspiracy against the public, and the Special Committee of the Corporation appointed for the purpose of dealing with the strike deserve the special thanks not only of the community of Leeds, but of citizens of England at large. From the first the Corporation presented a determined front, and when the Special Committee were appointed on December 17th they continued the policy of resistance which has led to success. The Committee had at their head Alderman C. H. Wilson and among the other four members was Alderman R. A. Smithson, chairman of the Tramways Committee. The union tramway men did join in the strike in "sympathy," but all went back in a day or two. The fact is that the conditions and wages in the tramway department are so excellent that the men had not the slightest ground for their action, and the position, as explained to them by the general manager, was so generally recognised to be untenable that the unionists were glad to escape from their dilemma. No praise can be too great for the loyal hands who, despite persecution of their wives by strikers, assisted Mr. Hamilton to keep the cars running. Meanwhile the Committee continued to deal firmly but considerately with employees in the other departments. They gave fair notice to strikers that if they did not return to work their places would be filled, and since then many vacancies have been filled. Citizen volunteers have worked nobly at making gas and at other jobs for the purpose of keeping public supplies going. Incidentally they discovered that in many cases the kind of day's work which the municipal employee has is not very hard even for a man not accustomed to it, and the "ca' canny" policy of trade unions and the levelling down of output to that of the inefficient man have been widely exposed. Various newspaper correspondents carrying on investigations in Leeds have found evidence that this attack on the Corporation and the citizens was intended as a preliminary (if successful) to similar action in other towns. Some go so far as to say that a general anti-municipal campaign would have been followed by strikes all over the country against private employers. The ultimate object of such tactics is of course to transfer industries from their present owners to the ownership of trade unions. Though the Leeds attempt has been badly beaten, the movement has not spent itself. There was the beginning of a strike of gas workers and other municipal labourers in Blackburn on Wednesday. Concessions have been offered to certain classes, but the employees want concessions to all. In Bradford the scavengers are in a state of unrest, though less than a year ago, as the result of a strike, they were put on time wages instead of piece-work at a material addition to the cost of running the cleansing department. The only policy which is safe for municipalities when confronted with unreasonable demands is to take up a determined stand and to show employees that it is a much more serious thing to strike against a municipality than it is to attempt to force higher wages out of a private employer.

ENFORCEMENT OF BY-LAWS.

Tramway authorities generally will be interested in the outcome of a number of prosecutions for alleged infringement of the Glasgow tramway by-laws, heard on December 24, by the stipendiary magistrate. Mention has already been made in our columns that, as the result of increased vigilance on the part of the tramways staff, nearly eight hundred cases had been reported in which persons were alleged to have offended against the regulations, more especially on the part of boys hanging on to the cars, passengers spitting on the cars, and carters obstructing tramcars by travelling on the tramway track. About sixty of these cases were down for hearing at the police court, when eight of the spitters were fined, three carters were convicted and admonished, and in the cases of 47 carters the summonses were withdrawn. Mainly by the process of paying unnecessary attention to the hair-splitting arguments advanced for the defence in some of the cases, a local newspaper has attempted to raise a mountain out of a mole hill and has suggested that in view of the magistrate's findings a deadlock seems imminent unless there is a rapid change of policy by the Tramways Committee. It is further stated, that in all likelihood an official statement will be made public shortly

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in order that the travelling public may be definitely informed of their rights and privileges. In reality, however, there is need for neither a rapid change of policy nor an official statement. The by-laws upon which the prosecutions were founded are well known, and convictions have been obtained under them in Glasgow and many other places. All that is necessary is that proceedings should be instituted regularly, instead of securing an accumulation of offenders detected by means of numerous members of the staff placed upon duty in plain clothes. It is doubtless an aid to detection to employ officers in mufti, and there are many tramway undertakings where the comfort of passengers generally would be added to if men in plain clothes were regularly detailed for this duty, more especially as regards expectoration. Sufficient convictions were obtained in Glasgow on this occasion to remind the public of the existence of the by-laws. Apparently the only instances of an offence for which convictions were not obtained, were the cases in which boys were found riding on the steps of cars. In these summonses the contention was advanced that it was inconsistent to punish the lads when the management had intimated that during the holidays six passengers would be allowed to stand inside a car which had already its stipulated complement. If, as was urged, the department in granting this concession are themselves infringing a by-law, the difficulty can be easily overcome by securing the sanction of the Board of Trade, or of whatever department the Scottish tramways may come under in this matter. While several of the carters were convicted, in some other cases there was a discussion as to what constitutes a sufficient reason for a carter travelling on the rails. This is just the reason why the cases are brought into court, and in this class of offence there has been no relaxation of the vigilance of the department. Wholesale prosecutions took place last year, and numerous cases have been before the court during the past few months. A peculiar plea was put forward in the cases in which spitting was alleged. When the Corporation took over the system smoking was prohibited "inside the cars," but the restriction was relaxed for "top-deck" travellers, where smokers are requested to take rear seats. Subsequently, the department began a crusade against spitting on the cars, but in the interval the covering of the upper portion of the vehicles was begun, until the great majority of the cars now have covered tops. Permission is given to smoke on the upper-deck, but the privilege is forbidden in the lower saloon. The concession in favour of the former patrons was said to be contrary to the by-laws; and, further, the view was put forth that to prohibit spitting while permitting smoking upstairs in the covered cars is inconsistent. The lawyer who advanced the arguments may be complimented upon the ingenuity with which he performed his duty to his clients, but all the same his contentions can hardly be surpassed for absurdity.

Light Railways Order.—The Board of Trade have recently confirmed the undermentioned Order made by the Light Railway Commissioners:—London and North Western Railway (Wolverhampton and Cannock Chase Light Railway) Transfer and Amendment Order, 1913, authorising the transfer to the London and North Western Railway Company of the powers, etc., conferred on the Wolverhampton and Cannock Chase Railway Company by the Wolverhampton and Cannock Chase Railway Acts of 1901 and of 1903 and by the Wolverhampton and Cannock Chase Railway (Light Railway) Orders of 1907 and of 1910, and extending the time limited for the completion of part of the railways thereby authorised, and authorising the London and North Western Railway Company to abandon other parts of such railways and to construct new light railways in substitution therefor, and for other purposes.

ENCOURAGEMENT OF OMNIBUS TRAFFIC.

LINKING UP BIRMINGHAM WITH DISTANT TOWNS AND VILLAGES.

In addition to promoting a Parliamentary Bill for the extension of tramway routes and the development of new ones, the Birmingham Corporation are applying for powers to enable the tramways department to run motor omnibuses. At a recent meeting of the Corporation Councillor Harrison Barrow, chairman of the Tramways Committee, stated that they were negotiating with the Birmingham and Midland Motor Omnibus Company for the purchase of all their interests in the city, and he also pointed out that the company required to be afforded facilities within the city for running omnibuses to and from various Midland towns on condition that they would not in any way interfere with the tramway services. The purchase price agreed upon was £30,000, this sum also including the purchase of the depôt in Tennant Street. Since October the committee have been engaged with the company in the settlement of the details prior to signing the agreement, and the company have also been preparing to carry into effect at next Whitsuntide their scheme of running omnibuses to many towns and villages within a radius of thirty miles of Birmingham. Among places proposed to be served are Walsall, Sutton Coldfield, Lichfield, Tamworth, Coventry, Warwick, Leamington, Stratford-on-Avon, Bromsgrove, Redditch, Alcester, and Evesham.

It is hoped that at the January meeting of the City Council the Tramways and Watch Committees will present a report embodying the conditions under which the second named committee will license the company's vehicles to run from a starting point in the centre of the city. The two committees have held conferences on the question of preserving the rights of the Tramways Committee in regard to the tramway services and also those of the committee's motor omnibus services. Considerable discussion has taken place with reference to the minimum fare to be charged by the company within the city, the suggestion having been made that the minimum fare in the city shall be in excess of the fares charged on the tramways and the Corporation's omnibuses, in order to deter the company from picking up or setting down passengers within the city in competition with the Corporation.

Partly as the result of the development already effected in the company's services to the outer suburbs and towns the Christmas traffic on the Birmingham tramways showed an increase. On Boxing Day there was an addition of £350 as compared with the same day in 1912, and on Christmas Day also the returns were augmented by holiday passengers who were brought to the city. It is now possible to travel fourteen miles to Walsall on one omnibus. Passengers can also journey between Birmingham and Worcester, a distance of 26 miles (an omnibus meeting the Corporation tramcars at Rubery) for a payment of 1s. 11d., which is 3d. less than the railway fare.

TRAMWAY COMPANIES TO DEVELOP ROAD MOTORS.

Important proposals are contained in letters that have just been submitted to the shareholders of the Gateshead, Jarrow, and Tynemouth Tramway Companies. They state that the Northern General Transport Company, Limited, have been formed for the purpose, among others, of carrying on and developing in the Northern counties transport business in all its branches, including the carriage of passengers and goods by motor vehicles and of acquiring interests and undertakings carrying on such business, and especially with a view to consolidating the interests of these three Tyneside companies.

The Gateshead company have purchased and are operating a number of motor vehicles in connection with their tramway system and also in the area adjacent to the Jarrow company's tramways, while the Tynemouth company have also decided to acquire and work a number of similar vehicles.

Having regard to the proximity of the areas of the three companies concerned and to the wide range and flexibility of services offered by modern motor vehicles, the development of separate services by the three companies is likely to lead to over-lapping and other difficulties. There is, moreover, a large scope for the development of motor traction both for passengers and goods, but such business to be successfully developed requires further expenditure of capital, expert knowledge, and special organisation, which the transport company will be likely to provide.

The Transport Company have an authorised capital of £250,000 in ordinary shares of £1 each, and £150,000 in 6 per cent. preference shares of £1 each, with power to issue debenture stock to an amount not exceeding the issued share capital for the time being. The scheme under which the shares of the various companies will be transferred to the Transport Company is outlined, and if all the issued shares are exchanged the nominal value of the shares and debenture stock to be issued by the Transport Company under the scheme will amount to £254,382 in £1 ordinary shares, £115,871 in 6 per cent. preference shares, and £54,500 in 5 per cent. debenture stock. In the event of the proposed exchange being effected, the company will have sufficient capital remaining available for issue to provide for the further development of the motor transport business. The directors are Mr. C. Shireff Hilton, chairman; Mr. H. S. Day, chairman of the Gateshead Tramways Company; Mr. C. R. Green, chairman of the Tynemouth Tramways Company; Mr. R. J. Howley; and Mr. L. A. Atherley Jones, K.C., M.P. for North-West Durham.

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RAILLESS TROLLEY TRACTION.

BRIGHTON.—The double-deck railless trolley car constructed by the R.E.T. Construction Company, Limited, at their Leeds works, as a specimen of the vehicles which the Brighton Corporation propose to run when their railless trolley system has been installed to Hove and elsewhere, arrived in the town on December 27. A short route is being installed on a portion of Preston Road for demonstration purposes, but during the night of December 28 the vehicle was given an experimental run on Lewes Road tramway route.

BOURNEMOUTH.—In consequence of a deputation having interviewed Poole Corporation with the object of inducing them to oppose the Bill which the Bournemouth District Railless Traction Company are promoting, Mr. F. Holloway, secretary to the company, has published a statement refuting assertions made in regard to railless traction, road wear, and other matters. He refers to the successful working of the Cedes-Stoll system at Keighley, and to the recent starting of a service of six Cedes-Stoll cars at Aberdare. His directors, he says, are advised that this system can be so installed that the vehicles on meeting or overtaking can pass each other without stopping. A special light design of standard is proposed to be used to support the wires, and where possible they would be erected in line with existing trees. Mr. Holloway is informed by the tramways manager at Keighley that road wear there is appreciably less with the trolley cars than with motor omnibuses.

NELSON.—Mr. G. F. Taylor, tramways manager and electrical engineer to the Nelson Corporation, has prepared a scheme for railless trolley installations for the Walverden and Southfield districts. In some of the thoroughfares tramways are impracticable owing to the narrow streets and the lowness of a railway bridge. After considering the claims of motor omnibuses and railless cars, the Tramways Committee favour the latter, and have appointed a committee to inspect existing installations in a number of towns. Outer, higher, and inner circle routes are suggested.

MISCELLANEOUS NEWS AND NOTES.

Vestibule Cars at York.—New cars lately placed in service on the tramways have vestibuled platforms.

Huddersfield Extension to Elland.—The extension of the tramways from Huddersfield to Elland Town Hall is expected to be opened about January 10.

Birmingham and an All-Night Car Service.—Over six thousand persons have signed a memorial to the City Council in favour of an all-night service of tramcars.

Aberdeen and P.A.Y.E. Cars.—At the next meeting of the City Council a recommendation will be presented by the Tramways Committee to proceed with the contract for six new double-deck prepayment cars.

First-Class Cars for Birmingham.—It is expected that the first-class tramcars for the Hagley Road route will be placed in service in the course of a few weeks, when the vehicles will be delivered by the builders.

The Dry Seat Problem.—Wolverhampton Tramways Committee are considering a suggestion to provide waterproof covers for the seats on the upper decks of cars, or alternately to afford the conductors means of drying the seats after rain.

Hull Tramwaymen Entertain Children.—The employees at the Cottingham Road depôt, presided over by Mr. C. Berry, the depôt foreman, on December 23 entertained 250 poor children. Mr. McCombe, the manager, and Mrs. McCombe were present.

New Cars for Accrington.—The Tramways Committee of Accrington Corporation have decided to purchase five new cars with vestibule ends. Advertisements for tenders will be issued as soon as the decision of the committee has been confirmed by the Council.

Dover Street Watering.—The Tramways Committee are considering the question of converting the motor rail groove water and cleaner car into a car suitable for street watering at the cost of £147, and the estimated cost of working is put at 4s. 6d. per hour.

The Suggested Amalgamation of Tramwaymen's Unions.—The executive of the Amalgamated Tramway and Vehicle Workers' Association, which has its headquarters at Salford, have decided against the scheme of amalgamation propounded at a recent conference of unions organising tramway workers. It is expected that the scheme will be abandoned.

Petition for a Conductor.—17,351 signatures have been attached to a petition sent to the Home Secretary praying for a reduction of the sentence of six months' imprisonment passed on a Sheffield tramways conductor for embezzling one penny. The man has served nearly three months of the sentence.

Tramcars for Russia.—The Council of Ministers has approved of the proposals to authorise St. Petersburg and Samara municipalities to purchase electric tramcars from abroad, if necessary. The orders, however, must be given to Russian works if their prices do not differ considerably from the prices tendered by foreign works.

Proposed Central Depot at Aberdeen.—The burgh surveyor has presented a scheme for purchasing the Militia Barracks and adapting the buildings for a central car shed. The estimated cost is £9,192, which includes the alterations, the erection of new sheds, the permanent way, the overhead equipment and electric lighting. Accommodation could be had for another car shed, the same size as that mentioned, as well as for the workshops being taken to the proposed site, thus giving additional accommodation for the electricity department at Millburn Street. A sub-committee are considering the scheme.

Proposed Strike to Obtain Vestibule Platforms.—A ballot is being taken of the Wolverhampton Corporation tramway employees as to whether they shall ask permission of the executive of their union to strike at the end of January if all the cars are not fitted with covered ends, if time and a quarter is not paid for Sunday labour, and if the motor omnibus men's wages and working conditions are not improved. Mr. W. A. Luntley, the general manager, states that the ballot is news to him, but he is considering the men's demands, and next week half the cars would be fitted with covered ends.

Requests for Omnibuses at Exeter.—At the suggestion of the Chamber of Commerce, the Tramways Committee are considering the desirability of providing motor-omnibus services to districts not served by tramways. A deputation informed the Committee that if the Council do not take the matter up, a sub-committee of the Chamber were prepared to do so. Col. Napier, of the Royal Field Artillery, has asked the Committee to run an omnibus service on the Topsham Road for the convenience of men at the barracks and the Territorials whose drill-hall is situated opposite the barracks. The Devon Territorial Association are willing to defray the fares of men attending the hall for drill.

Through Running from London.—Erith Council have agreed to act with the London County Council in instituting through services on the two tramway systems between Beresford Square, Woolwich, and the Market Place, Bexley Heath, viâ Abbey Wood. The County Council's tramways will be extended so as to join the Erith Council's lines at Abbey Wood, the work to be undertaken as soon as the County Council have approved the necessary estimate and voted the expenditure therefor. In the event of the Bexley Council refusing to give their consent, the Erith Council will permit County Council cars to run between Abbey Wood and Northumberland Heath.

New and Prospective Work.—Southend Council have adopted a scheme of tramway extensions and doubling estimated to cost about £15,000. Rails are to be laid along the new loading pier in order to join up with the tramway system for the conveyance of coal to the generating station. £60,000 is to be borrowed for additional plant required to meet the demands for current from private consumers.—By an additional doubling of the track which the Llandudno and Colwyn Bay Electric Railway Company propose to carry out, the double track will then extend from Rhos-on-Sea to the centre of Llandudno.—Manchester Tramways Committee propose to double the track in Plymouth Grove.

Thermit, Ltd., have sent their usual note-book as a reminder of the New Year. It contains many useful particulars, including serviceable notes on the "Thermit" welding system, now so well known and so widely used on tramway tracks. Referring to the work of the year, it is stated that Manchester, Bradford, and Leeds, whose experience of the Thermit joint covers nine years, continue to weld all their rails, and with a practically negligible number of broken joints. Among other systems which have carried out welding operations during the year are Ayr, Bolton, Bournemouth, Bristol, Burnley, Dublin, Great Yarmouth, Huddersfield, Liverpool, London C.C., Portsmouth, Sheffield, Southampton, York, etc.

Workmen's Fare Difficulty at Exeter.—The Tramways Committee have deferred consideration of a report from a sub-committee suggesting that half-fare tickets to all passengers be issued before 8.30 a.m.; that from February 1, 1914, return tickets for the same day at a single fare be issued to all passengers between the hours of 12.30 p.m. and 2 p.m., except on Sundays and public holidays; that in order to relieve the conductors of the responsibility of discriminating between persons who are entitled to workmen's tickets during the evening hour and those who are not, books of tickets be provided, and employers of labour invited to dispose of them to bona-fide workmen, the books also to be placed on sale at the tramway depôt.

A Prison Tramcar.—While an outcry is made in this country whenever the police are found using a tramcar to convey prisoners from the court to jail, a special car has been provided in Montreal for the conveyance of prisoners from the Court House to Bordeaux Castle. It bears the inscription "Prison" on the indicator, and from an exterior point of view it is not attractive. It is made of sheet steel, painted dark olive green, and has square-shaped windows near the top of such a size that it is "impossible for one to enjoy the scenery." On the front gleams a headlight that lights up the countryside as the car makes evening trips. The car is divided into two compartments. The seats all run crosswise, and will seat two each, the total accommodation being sixty. The seats are arranged in this fashion because the handcuffs worn by the passengers demand that they travel in pairs. When not in use the car is stored in the St. Denis Street depôt of the Montreal Tramways Company.

Manager's Judgment or Doctor's Certificate?—A question having arisen between Bury Tramways Committee and the men's union with regard to a motorman's fitness to resume duty after illness on producing a medical certificate, the Committee have reported to the Council that they had considered the advice given by the Town Clerk, which was supported and confirmed by the opinion of eminent counsel. It was to the effect that the Corporation would not be relieved from responsibility in the event of an accident arising during the time a car was being driven by a motorman who was, in the manager's opinion, not in a fit physical condition to drive a car, even if such motorman produced a doctor's certificate of fitness. The Committee recommended that the manager be instructed to use his own judgment as to the advisability or otherwise of allowing a motorman to re-commence duties after an illness. The Corporation have adopted the recommendation.

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Christmas Day Sports.—Alderman Dunsford, J.P., chairman of the Tramways Committee and president of the Southampton Tramways Social and Athletic Club, the members of the Tramways Committee, and the employees united on Christmas morning to secure the successful carrying out of the annual sports. Mr. L. Johnston, the tramways manager, had taken an active part in arranging the programme, and it was a matter of general regret that he was unable to attend the first sports meeting held since his appointment, having been called to London by the serious illness of his brother. The Dunsford challenge shield, awarded to the section securing the highest number of points on results, was won by Portswood depôt. The prizes were presented to the winners by Alderman Dunsford.

Edgar Allen and Company, Ltd., Imperial Steel Works, Sheffield, issue a useful book of memoranda relating particularly to tramway special work. The book includes specifications of Allen's "Imperial" manganese steel joints and crossings, with illustrations and descriptions of Allen's patent three-way mechanism, Allen and Warlow's patent three-way automatic controller, pinless tongue, and Holt's patent guard rail. There are also numerous pages of detailed dimensions and diagrams, including, among others, repair points, on which the various parts are named, details of easement curves, and particulars of turnouts. Many other useful tables are included, and with a copious index and a number of pages of chart paper for memoranda, the little book, which is neatly and strongly bound, forms a very convenient pocket reference.

The Continental Tyre Company, of 3 and 4, Thurloe Street, South Kensington, S.W., is again issuing its popular complimentary pocket-book, which has for many years been greatly appreciated by users of commercial motor vehicles. The pocket-book is most convenient in size and serviceable, containing as it does some 80 pages for personal memoranda in addition to calendars for 1914 and 1915, and information specially applicable to users of commercial motor vehicles. It is encased in a handsome red Russian leather cover, and a refill and two pencils accompany each book. As indicated above, the demand for this excellent pocket-book is extensive, and, consequently, those who are desirous of availing themselves of the gift of the Continental Tyre Company are recommended to send their request promptly, at the same time giving licence number and stating make of vehicle.

A Dewsbury Accident.—An inquiry was held on December 30 at Dewsbury into the death of a passenger who was killed by jumping out of a tramcar which ran downhill in Wakefield Road. Mr. W. Gibbon, the manager of the Tramway Company, said that the accident was caused by the driver of the car losing his head. If he had kept cool the driver could have so applied the brakes as to have either brought the car to a standstill or have run it slowly down the hill. When he examined the car after the accident all the brakes were in perfect working order, but he assumed that the driver had forgotten to reverse a certain lever before attempting to apply the electric brake. Until he had reversed the lever the latter brake could not act. He had so much confidence in the driver that with the permission of his directors he intended to reinstate him. On the day of the accident the man had been unnerved by a runaway horse which passed his car at full speed.

Tramway Developments in West Fife.—Major Pringle, Board of Trade inspector, on December 27 made an inspection of the extension of the Dunfermline and District Tramway Company's system to Milesmark. The route extends to one mile and an eighth. The inspector was accompanied in the special car by Mr. J. H. Shepherd, the manager and engineer, and Provost Husband and several members of the Town Council; and later in the day the route was opened for traffic. Provost Husband expressed the hope that before long they would see the tramways extended westward to the populous and growing mining communities of Valleyfield and Torryburn. To the south of the town they also looked for development of the tramways. The present year, he prophesied, would witnes a boom in building. On a recent visit to London, he said, Mr. Balfour, the managing director of the company, indicated that as soon as building operations were advanced and the Rosyth area became populated, the tramways would not be long in following. In replying to the toast of "Continued Prosperity to the Tramway Company," proposed by the Provost, Mr. Shepherd said that in the not distant future the likelihood was that tramway developments would take place to the west and south of Dunfermline.

A Bradford Conductor Rewarded.—On December 29, Mr. C. J. Spencer, the general manager, reported to the Tramways Committee the circumstances under which Conductor Birkett had prevented an accident that might have had serious consequences. On Boxing Day, when the 10.25 p.m. car from Thornton to Bradford had reached the end of Grattan Road, the driver fell off the car while it was going at full speed. For some time his disappearance was not noticed, but when the car had nearly reached Godwin Street the conductor, realising that the car was running at a rapid rate, discovered the absence of the driver and promptly shut off the supply of current. He then controlled the car from the rear, an accomplishment which, Mr. Spencer said, demanded unusual skill. The car was pulled up when halfway down the steep incline of Sunbridge Road, which has a fall of 1 in 14. A tramway inspector, on joining the car, found that the controller was in the full-speed position, which showed that but for the action of the conductor the car would have run down Sunbridge Road at a speed of from thirty to thirty-five miles an hour. The car was practically full of passengers, and at the bottom of the road were two cars waiting to make the outward journey. Birkett was called before the committee, who awarded him the sum of £5.

CONTRACTS AND ORDERS.

Edgar Allen and Co., Limited, have secured a contract for the supply of a crossover to Southend tramways, at £620.

Batley Council have accepted the tender of the Brush Electrical Engineering Company for a 1,200 kw. turbo-generator.

Cars Required for Johannesburg.—Tenders are required by the Johannesburg Council for fifteen double-deck tramcars and spare parts. Tenders must reach the Town Clerk by noon on January 22.

Bell's United Asbestos Company, Limited.—The War Office has accepted this company's tender for the supply during three years, 1914 to 1916, of asbestos cement roofing slates, wall and ceiling sheets. These will be made at the company's Poilite factory, near London.

Glasgow Tramways Committee have accepted the following tenders:—Telephones, J. McMillan and Co.; white lead, Hird, Hastie and Co.; adhesive tape, A. Avtsine; car bells, Standard Electric Company, Limited; car brake chains, Weldless Chains, Limited; trolley cord, W. C. Yuille and Co. and W. G. Black; rubbers for snow ploughs, George M'Lellan and Co.

Omnibuses for Southend.—The Town Council have placed the following contracts:—Three petrol chassis, £680 each, Straker and Squire, Limited; three petrol-electric chassis, £600 each, A. W. Stevens, Limited; one Edison Accumulator chassis, £825; seven car bodies, £180 each, Brush Electrical Engineering Company. It is proposed to use the vehicles in outlying districts.

International Railophones, Limited, report that they have just received a third trial order from the Swiss Federated Railways for "K.K." detectors. They also mention that with the aid of this instrument it has been found possible to transmit telegraphic messages through the St. Gothard tunnel. This it has previously been found impossible to do.

Montreal Railway Contracts.—The Canadian General Electric Company have received a contract from the Montreal and Southern Counties Railway Company, for the electrical equipment of the Rougemont sub-power station. The Canadian Westinghouse Company, of Hamilton, have obtained a contract for the electrical equipment of an order of cars, from the National Steel Company, for the same railway.

Petrol-Electric Cars for Hastings Esplanade.—As already reported in these columns W. A. Stevens, Limited, have received an order from the Hastings and District Tramways Company for twenty petrol-electric tramcars for service in connection with the sea front section of the tramways. The Board of Trade's licence to the company to continue the use of the Dolter surface contact system expired on January 1, but as the petrol-electric cars will not be delivered for two or three months the Tramways Company proposes to ask the Board to renew the licence.

Sydney Council have placed the following contracts:—Babcock and Wilcox, Ltd., pneumatic ash handling plant for new boiler house, £3450, plus £800 duty, and 1,200 wheels, 1,200 bushes 600 pins and 600 washers £157 10s. (estimated); Willans and Robinson, Ltd., two circulating pumps for two turbine sets, £540, and oil pump for three 4,000 kw. turbines, £53 3s.; Australian Engineering Supply Company, 100 boiler tubes, £135; Australian General Electric Company, three remote control oil switches, £55; W. Adams and Company, feeder pillars, £970.

PERSONAL.

Mr. J. McEntree, of Belfast, has been appointed assistant electrical engineer to Dunkald Council.

Mr. W. B. Cownie, of the National Electric Construction Company and other tramway undertakings, is paying a visit to Constantinople.

Mr. E. S. Riley, of Hull, has been appointed assistant on the engineering staff at the Walthamstow electricity works at a salary of £150 per annum.

Mr. J. Fitzgerald, of the Bristol Corporation electricity department, has been appointed as representative engineer in the Bristol branch of Simplex Conduits, Ltd.

Mr. A. Coveney, general manager and electrical engineer to Erith Council tramways, has received an increase in his salary from £350 to £400 per annum as from November 17 last.

Mr. J. W. Blakemoor, chief traffic clerk, Salford Corporation Tramways, has been recommended for appointment to the post of traffic superintendent, and Mr. F. Ellwood as chief traffic clerk.

Mr. A. W. Annetts has been appointed electrical engineer to Morecambe Council at a salary of £150 per annum. The Council have retained for three months the services of Mr. L. B. Hogarth, who is leaving for Whitehaven, as advisory engineer.

Mr. Nichols Moore, Newport borough electrical engineer and permanent way engineer of the tramways, has been awarded an honorarium of 25 guineas, and Mr. Thaine, deputy engineer, 10 guineas, in recognition of their work in connection with the installation of new plant at the generating station. The workmen are to have a sum of 25 guineas divided amongst them.

Mr. I. Bulfin, Bournemouth tramways manager, on Boxing Day entertained the night staffs of all the depôts to breakfast for the fourth successive year. In the unavoidable absence of Mr. Bulfin, Mr. Hartley, superintendent of car sheds, wished the company a very enjoyable time and a prosperous and happy New Year. Hearty cheers were given for Mr. and Mrs. Bulfin and Master Bulfin. On Christmas Eve Mr. Bulfin presided at the annual dinner of the men of the Parkstone depôt, when the toast of the manager and family was musically honoured and Mr. Bulfin was thanked for his generous support.

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Mr. T. J. Kendrew, general manager, Southport Corporation Tramways, who presided at a dinner of the tramways and electricity employees, thanked the staff for the way they had assisted him since his reinstatement as manager of the tramways. The results of their endeavours had been highly satisfactory, and from the office staff to the depôt men every man had done his duty. It was only a week or so ago that a high compliment was paid the men by the Tramways Committee for their satisfactory service since the tramways and electricity departments had been divided. He urged every man to take a pride in his uniform, and said that appearance went a long way in a man's life. Mr. J. Orme, on behalf of the Social and Athletic Club, thanked the manager for his kind remarks about the staff, and said every man would do his level best. They were pleased to see that the members of the Town Council took an interest in them.

Mr. C. W. Bentley, resident engineer and manager to the Musselburgh and District Tramways Company, who presided at the annual dinner of the employees, read a lteter from Mr. W. B. Cownie announcing that he should have pleasure in recommending to the directors the increase in the employees' pay suggested by Mr. Watson, the commercial manager, and Mr. Bentley. Mr. Cownie also stated that he was sure the staff would do their best to improve the results during the coming year, and if an improvement was again shown the management would have his hearty support if they were in a position to recommend a bonus at this time next year. In connection with the billiard handicaps at the club Mr. Cownie was to present the winners with two very fine cues. Bailie Constable, in proposing the toast of the Tramway Company, speaking of the advantages the tramways afforded the inhabitants, referred to the fact that the track was also used by vehicular traffic, and this was a saving to the ratepayers in road maintenance. Mr. R. Watson, in responding, said they had a staff that was a credit not only to the company but to the town in which they were placed.

FINANCIAL REPORTS AND MEETINGS.

North Wales Power and Traction Company.—The report of this company showed a debit balance on revenue account of £56,448 on June 30.

Tramways, Light and Power Company, Limited.—This company, which recently offered £200,000 of 5 per cent. debenture for subscription at £98 per cent., is the sole owner of the issued stocks and shares of the Derbyshire and Nottinghamshire Electric Power Company, the Nottinghamshire and Derbyshire Tramways Company, the Leicestershire and Warwickshire Electric Power Company, and the Midland Electric Light and Power Company, Limited, and of the great bulk of those of the Leamington and Warwick Electrical Company, Limited, which also owns a tramway between Leamington Spa and Warwick. The first issue of capital was made a year ago, when 300,000 6 per cent. £1 cumulative preference shares were offered for subscription and allotted, the proceeds being expended in the construction of the Nottinghamshire and Derbyshire tramways and the equipment and development of the power undertakings.

Cambridge Council and the Tramways Company.—The Corporation have decided to inform the Tramways Company that unless they could see their way to offer some other terms regarding the payment of the sum of nearly £300 for track maintenance, for which the Council have obtained judgment, it would be necessary to proceed with the petition for the winding-up of the company. Alderman Campkin expressed the opinion that the company were entitled to some consideration on account of what they had done in the past. Before they scrapped the horse tramways, from which for many years past they had received £1 every running day, he wanted to see that what was going to take the place of the tramways was going to pay its due share towards the upkeep of the roads.

COPPER AND ALUMINIUM MARKET.

January 2, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

	Yesterday.	Last week.	A Year Ago
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	64 15 0 ..	64 5 0 ..	76 5 0
,, ,, (three months)	65 7 6 ..	64 15 0 ..	77 7 6
Electrolytic Copper—bars or ingots ..	68 5 0 ..	66 15 0 ..	82 0 0
Aluminium—bars or ingots	83 0 0 ..	83 0 0 ..	87 10 0

COAL MARKET.

January 2, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

	Yesterday.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	s. d.
Best Admiralty Welsh (large)	25 6 ..	26 0 ..	24 0 ..	22 6
Best Seconds..	24 0 ..	25 0 ..	23 6 ..	21 6
Ordinary Drys	22 6 ..	23 0 ..	22 3 ..	20 3
Best Washed Nuts	21 0 ..	21 0 ..	21 9 ..	19 6
Best Washed Peas	19 6 ..	19 6 ..	20 3 ..	18 0
Cardiff, f.o.b.—				
Best Admiralty (large) ..	21 0 ..	21 6 ..	18 9 ..	17 6
Best Seconds	19 6 ..	20 6 ..	18 3 ..	16 6
Ordinary Drys	18 0 ..	18 6 ..	17 0 ..	15 3
Best Washed Nuts	16 6 ..	16 6 ..	16 6 ..	14 6
Best Washed Peas	15 0 ..	15 0 ..	15 0 ..	13 0
Newcastle, f.o.b.—				
Best Steams	15 3 ..	15 3 ..	15 3 ..	12 3
Best Seconds	13 0 ..	13 0 ..	14 0 ..	11 0
Smalls	7 0 ..	7 0 ..	11 0 ..	7 0

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912.	Latest Return. 1913.	Aggregate. Wks.	Aggregate. 1913.	Increase or Dec.
Anglo-Argentine	Dec. 23	£57,159	£59,432	51	£2,849,055	+£205.679
Auckland..... (28 days)	Nov. 21	19,174	10,497	21	92,254	— 4.949
Ballarat and Bendigo	October	444 6	4,356	30	26,988	— 605
Brazilian St. Rly. Mlrs.	Nov.	44,278	58,642	17	207,214	+ 85,873
Brazilian Traction.....	Dec. 27	*84,911	97,642	...	...	...
Brisbane	Nov.	24,310	27,053	48	287,071	+ 55,650
British Columbia .....$	Nov.	741,876	746,152	22	3,760,527	+ 283 424
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacroze..	Nov.	44,671	45.746	22	225,270	+ 8,901
Calcutta.....Rs.	Dec. 27	66 164	70,774	52	33,71,408	+ 1,60,615
Cape Town	Nov.	...	12,555	...	...	..
Carthagena & Herreria	Nov.	1,708	1,922	47	28,165	+ 4,620
Cordoba	Nov.	12,193	13,447	35	107,457	+ 10,471
East India	Nov.	1,924	1,922	17	7,883	+ 145
Kalgoorlie.....	Nov.	2,861	2,504	48	31,603	— 3,001
La Plata.....	Nov.	5,210	5,409	44	55,840	+ 9,526
Lima.....	Sept.	22,660	34,110	39	300,647	+ 23,783
Lisbon ..... Mlrs.	Sept.	...	144,538	...	...	...
Madras (14 days) Rs.	Dec. 31	29,482	30,800	52	614,192	+ 46,109
Melbourne	Nov.	...	63,500	...	...	...
Mexico ..... $	Nov.	565,239	605,467	48	6,387,805	+ 177,861
Montevideo.....	Nov.	29.628	30,530	4	30,530	+ 907
Para	Dec. 28	4,020	3,365	4	13.356	— 2,357
Port Elizabeth.....	Nov.	...	3,530	...	...	...
Shanghai .....$	Dec. 24	19,299	22,600	51	1,156,016	+ 136.355
Singapore .....$	Dec. 29	10,266	11,319	52	620,696	+ 79,648
Toronto .....$	Nov.	742,156	849,279	48	8,893,984	+1,176,680
Winnipeg.....$	Nov.	345,031	360,082	48	3,698,831	+ 295,148

(*Continued from page 2.*)

POSITIONS VACANT.

SINGAPORE MUNICIPALITY.

ASSISTANT ELECTRICAL ENGINEER.

The Municipal Commissioners of the Town of Singapore, in the Straits Settlements, invite applications for the appointment of an Assistant Electrical Engineer for their electricity undertaking. The successful candidate should not be under 26 nor over 33 years of age, and he must have at least one year's workshop experience in the manufacture of transformers and high tension apparatus. He should have a good technical education, and have been employed in the mains department of direct current and alternating current stations. The successful candidate will be required to pass a medical examination as to his fitness for residence in a tropical climate. The appointment will be for 3 years, at a salary of $250, $275, and $300 per month for the first, second, and third years respectively. The dollar fixed by Government is at 2s. 4d. sterling. Second-class passage will be provided by mail steamer or first-class passage by other vessel, with half-pay during voyage out. Further particulars can be obtained from C. C. Lindsay, Esq., M.Inst.C.E., 180, Hope Street, Glasgow, to whom applications giving full particulars of education and experience, and referring to the above requirements seriatim, must be sent, endorsed "Assistant Electrical Engineer," not later than January 13, 1914.

OVERHEAD LINESMAN.

Wanted, Overhead Linesman, wages 45s. per week. Applicants must state their age and experience, and enclose copies of three testimonials. Applications to be addressed to Box 86, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.

POSITION WANTED.

TRAMWAY MOTORMAN.

Tramway Motorman (Scotch), thoroughly experienced, desires change to some English tramway system. Would like situation as motorman on electric railway system. Abstainer. 25. No. 33, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1912.	1913.	Incr. or Dec.	Aggregate. Wks.	1913.	Increase or Dec.
Aberdeen Corporation..	Dec. 24	£1,497	£1,499	+ £12	30	£49,052	+ £3,112
Accrington Corp.	,, 24	639	633	— 6	38	22,154	+ 2,000
Ayr Corporation	,, 27	210	244	+ 34	32	13,193	+ 1,894
Bath Electric	,, 24	903	885	— 18	52	49,319	+ 3,865
Birkenhead Corp.	,, 28	1,319	1,330	+ 111	39	50,641	+ 4,851
Birmingham Corp.	,, 20	11,978	12,817	+ 841	38	449,082	+ 39,326
Blackburn Corporation	,, 24	1,367	1,399	+ 32	39	51,674	+ 4,760
Blackpool Corporation	,, 25	600	595	— 5	38	76,193	+ 12,113
Bolton Corporation	,, 28	2,782	2,829	+ 47	39	107,070	+ 6,102
Bournemouth Corp.	,, 31	1,783	1,681	— 102	39	84,008	+ 9,476
Bradford Corporation...	,, 27	6,130	6,268	+ 138	38	232,049	+ 13,975
Brighton Corporation...	,, 28	980	1 019	+ 39	39	44,095	+ 3 003
Bristol	,, 26	8,845	9,347	+ 502	51	413,240	+ 53,019
British Elec. Federatn.	,, 12	38,551	44,325	*	...	...	...
Burnley Corporation ..	,, 27	1,762	2,024	+ 262	39	61,929	+ 7,382
Burton-on-Trent Corp.	,, 28	323	336	+ 13	39	11,600	+ 587
Bury Corporation	,, 28	1,419	1,427	+ 8	39	53,065	+ 2,161
Cardiff Corporation	,, 13	2,519	2,632	+ 113	37	101,719	+ 10,943
Chatham and District..	,, 25	977	940	— 37	51	47,453	+ 2,947
Chesterfield Corp.	,, 25	300	301	+ 1	38	10,058	+ 1,167
Colne & Trawden	,, 27	286	291	+ 5	52	14,178	+ 817
Cork Electric	,, 25	537	514	— 23	51	25,640	+ 700
Croydon Corporation ...	,, 19	1,720	1,634	— 86	37	62,373	— 6,007
Darlington Corporation	,, 27	264	283	+ 19	39	9 770	+ 923
Derby Corporation	,, 27	1,059	1,053	— 6	39	38,583	+ 3,703
Dover Corporation	,, 27	222	210	— 12	39	9,819	+ 166
Dublin & Lucan	,, 31	253	267	+ 14	26	3,859	— 13
Dublin United	,, 26	6.142	5,582	— 560	51	281,254	— 17,369
Dundee City	,, 24	1,294	1,346	+ 52	32	42,197	+ 3.225
East Ham Corporation	,, 27	1,259	1,127	— 132	39	40,169	— 1,802
Exeter Corporation	,, 27	355	344	— 12	39	13,586	+ 672
Gearless Motor 'Buses.	,, 27	...	894	...	38	18,810	...
Glasgow Corporation ...	,, 27	20 021	21,061	+ 1,040	30	611,247	+ 45,944
Glossop (U.Elec.Supply)	,, 27	139	138	— 1	52	6,707	+ 572
Halifax Corporation ...	,, 28	2,160	2,001	— 159	38	81,467	+ 2,735
Hastings & District.....	,, 25	904	859	— 45	52	53.215	+ 3,800
Huddersfield Corp.	,, 27	2,493	2,479	— 4	39	83,515	+ 4,655
Hull Corporation	,, 27	3,474	3,495	+ 21	39	123,040	+ 6,332
Ilford U.D.C.	,, 27	538	515	— 23	39	17,735	— 903
Ilkeston Corporation ...	,, 31	123	122	— 1	40	5,334	+ 805
Ipswich Corporation ...	,, 27	473	444	— 29	39	18,230	+ 734
Isle of Thanet	,, 27	355	374	+ 19	13	4,776	+ 503
Kilmarnock Corp.	,, 27	167	174	+ 7	32	5,702	+ 287
Lanarkshire	,, 25	1 566	1,762	+ 196	51	88,204	+ 11,528
Lancashire United	,, 24	1,509	1,594	+ 85	51	79,876	+ 10,023
Leeds City	,, 6	7,499	8,070	+ 571	36	298,887	+ 19,202
Leicester Corporation..	,, 27	3,112	3,086	— 26	52	145,942	+ 12,600
Leith Corporation	,, 27	675	668	— 7	32	23,108	+ 1,110
Leyton U.D.C.	,, 18	1,270	1,294	+ 24	37½	50,686	+ 379
Liverpool Corporation..	,, 27	13,253	14,097	+ 839	52	670,292	+ 49,018
Llandudno & Colwyn B.	,, 26	206	174	— 32	4	567	— 10
London County Council	,, 24	45,036	46,553	+ 1,517	37	1,623,057	+ 7,035
London Gnl. Omnibus..	,, 27	52,607	54,078	+ 1,471	52	3,204,390	+ 514.933
London United	,, 26	6,806	6,799	— 7	52	325,298	+ 6,772
Lowestoft Corporation	,, 20	176	199	+ 23	11	2,237	+ 178
Maidstone Corporation	,, 11	158	170	+ 12	37	7,700	+ 575
Manchester Corp.	,, 27	17.278	17,114	— 164	39	687,352	+ 32.810
Met. Elec. Trys.	,, 26	10,375	10,231	— 144	52	469,392	+ 15,235
Nelson Corporation	,, 27	214	225	+ 11	39	8 226	+ 456
N'castle-on-Tyne Corp.	,, 27	5,055	5,543	+ 488	39	191,633	+ 17,392
Newport (Mon.) Corp.	,, 27	863	903	+ 40	39	30.224	+ 2,348
New St. Helens & Dist.	,, 24	846	853	+ 7	26	21,717	+ 2.216
Northampton Corp	,, 26	655	623	— 32	39	22,608	+ 1,459
Nottingham Corp.	,, 25	3,286	3,175	— 111	38½	129,646	+ 5,723
Oldham Corporation ...	,, 28	2,275	2,431	+ 156	40	88,813	+ 6,430
Portsmouth Corp.	,, 27	1,769	1,923	+ 157	39	99,490	+ 6,475
Preston Corporation ..	,, 17	799	792	— 7	33	33.652	+ 2,166
Provincial	,, 27	1,815	1,941	+ 126	13	22,073	+ 1,539
Reading Corporation ...	,, 25	791	813	+ 12	38	27,129	+ 2,087
Rochdale Corporation	,, 27	1,736	1,782	+ 46	39	63,072	+ 2 648
Rotherham Corp.	,, 31	1 175	1,173	— 3	39	39,891	+ 8,584
Salford Corporation ..	,, 30	4,874	5,187	+ 313	39	205 245	+ 9.661
Sheffield Corporation...	,, 28	8,291	8,321	+ 30	40	293.233	+ 22.910
Southampton Corp.	,, 25	1,251	1,445	+ 194	38	51,708	+ 3.386
Southend-on-Sea Corp.	,, 24	809	817	+ 208	39	38.056	+ 6,741
South Met. Trys.	,, 26	1 021	1,265	+ 244	52	49,713	+ 6,204
South Shields Corp.	,, 27	752	809	+ 57	39	28,272	+ 3.406
Sunderland Corp.	,, 28	1.560	1,592	+ 32	39	56,783	+ 5.433
Sunderland District	,, 24	578	589	+ 11	8	4.466	+ 444
Swindon Corporation ...	,, 24	212	202	— 10	38	6,470	+ 414
Trys. (M.E.T.) 'Buses	,, 27	...	8,052	...	48	274.252	...
Tyneside Trys. & Tmrds	,, 24	540	534	— 4	26	18,451	+ 519
Wallasey Corporation	,, 27	1 078	1,171	+ 93	39	48.060	+ 4.449
Walsall Corporation ...	,, 27	849	899	+ 50	52	32,711	+ 2.309
Walthamstow U.D.C....	,, 27	832	906	+ 74	39	29,491	+ 1,114
Warrington Corp	Nov. 27	438	458	+ 20	35	15,018	+ 502
West Ham Corporation	Dec. 25	3,040	3 061	+ 21	38	105,547	+ 4.013
Wigan Corporation	,, 23	1,625	1,692	+ 67	38½	57,773	+ 5,589
Wolverhampton Corp	,, 31	1,305	1,166	— 139	40	43.252	+ 2.277
Yorkshire (W. Riding)	,, 28	1,838	1,846	+ 8	52	75.334	+ 7,316

* From such of the services as were working both last year and this year the receipts show a decrease of £4,564 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1912.	1913.	Incr. or Dec.	Aggregate. Wks.	1913.	Increase or Dec.
Central London.....	Dec. 27	£4,407	£4,481	+ £74	52	£234,195	+ £4,322
City and South London	,, 27	2,466	2,878	— 588	52	144,992	— 14,184
Liverpool Overhead.....	,, 28	1,500	1,533	+ 33	52	88,979	+ 6,645
London Electric.....	,, 27	13,460	13,780	+ 320	52	711,595	+ 970
Mersey	,, 27	2,317	2,305	— 12	52	116,063	+ 4,457
Metropolitan	,, 29	17,484	19.184	+ 1,700	52	902,258	+ 35,507
Metropolitan District	,, 27	12,200	12.705	+ 505	52	675 747	+ 18,990

The Tramway & Railway World can be obtained, post free, at the following rates:—

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Telegraphic Address: "Tramigro," London.

AMBERLEY HOUSE, NORFOLK ST., W.C.

TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, January 2.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	72 — 75
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref	...	4⅛ — 4⅜ xd
5	Do. 5½% Cum. 2nd Pref.	...	4 — 4⅛ ,,
100	Do. 4% Deb. Stk. Red.	— 2	88 — 90 ,,
100	Do. 4½% Deb. Stk. Red.	— 1½	96 — 98 ,,
100	Do. 5% Deb. Stk. Red.	...	97½ — 99½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	— 1½	100 — 102 xd
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅞ — 1
1	Do. 5% Cum. Pref	...	⅞ — 1
100	Do. 4½% 1st. Mort. Deb. Stock, Red.	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Sk.	...	84 — 86 xd
10	Blackpool and Fleetwood Tramroad Co.	...	13½ — 14
	Bombay Elec. Supply and Trams. Co., Ord.	...	12 — 13
10	Do. do. 6% Cum. Pref.	...	10¾ — 11½
100	Do. do. 4½% Db. Stk Red.	— 3	92 — 94 xd
$100	Brazilian Traction Light and Power Co. Lim.	— 2½	82½ — 84½
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	...	7¼ — 7¾
5	Do. do. 5% Cum. Pref	...	4⅞ — 5⅜
100	Do. do. 4½% 1st Deb Stock, Red.	— 2	96 — 99 xd
10	Bristol Tramways and Carriage Co.	...	5½ — 5¾
10	Do. do. 4% Cum. Pref.	...	6¼ — 6¾
100	Do. do. 4% Deb. Stock	...	100 — 102
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	— 1	105 — 109 xd
100	Do. Pref. Ord. Stock	...	102 — 106
100	Do. 5% Cum. Perpetual Pref. Stock	...	102 — 105
100	Do. 4½% 1st Mort. Debs.	...	98 — 101
40	Do. 4½% Vancouver Power Debs.	...	100 — 104
100	Do. 4½% Perpetual Cons. Deb. Stk.	...	92 — 95
100	British Elec. Traction Co., Lim., 6% Cum. Pref.	+ 2	86 — 89
100	Do. 7% Non-Cum. Pref.	...	52 — 55
10	Do. 6% Pref. Ord. Non-Cum.	+ 1	11½ — 13½
100	Do. Deferred Ord. Stock	+ ⅛	4½ — 6
100	Do. 5% Perpetual Debenture Stock	...	92 — 93
100	Do. 4½% Second Debenture Stock, Red	...	77 — 80
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	84 — 89
100	Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb.	...	99 — 101
5	Calcutta Tramways Co., Limited. Ord.	+ ⅛	6 — 6⅛
5	Do do. 5% Cum. Pref.	— 1/10	4⅞ — 5⅛ xd
100	Do. do. 4½% 1st Deb. Stock, Red.	— 2	93 — 96 ,,
1	Cape Electric Tramways, Ld.,	...	3/32 — 3/16
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	3 — 3¼
100	Do. 5% Debs. Red.	— 2	89 — 91 xd
5	City of Buenos Ayres Trams. Co. (1904), Lim.	...	5¼ — 5½
100	Do. 4% Debenture Stock Red. 1985	— 1	91 — 96 xd
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.	...	88 — 92
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	— 2½	93 — 95 xd
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	— 8⅛
10	Dublin United Trams. Co. (1896) Lim. Ord.	+ ½	— 11
10	Do. do. 6% Pref.	+ 1/8	— 12½
100	Do. do. "A" Red.	...	— 78½
100	Do. do. Deb. Stock "B" Red.	...	— 77
10	Gateshead & Dist Trys. Co., Ord.	...	9 — 9¼
10/-	Hastings & Dist. Electric Trams. Co., Ld., Ord.	...	⅝ — ¾
1	Do. do. 6% Cum Pref.	...	⅝ — ¾
100	Do. do 4½% Deb. Stk. Red.	...	66 — 71
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	94½ — 98½
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)	...	84¼ — 89½
10	Imperial Tramways, Ord.	...	3½ — 4¼
10	Do do. 6% Cum. Pref.	...	6¼ — 6¾
100	Do. do. 4½% Deb. Stock	...	76½ — 77½
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.	...	2 — 2¾
100	Do. 4% Debenture Stock	— 2	71 — 76 xd
1	Kalgoorlie Elec. Trams., Ltd.	...	0 — 1/16
100	Do. do. 5% "A" Deb. Stk.	...	85 — 90
10	Do. do. 6% "B" do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.	...	⅜ — 1
10	Lanarkshire Tramways Co.	...	9½ — 10¼
100	Lancashire United Tramways. 5% Prior Lien Deb.	— 2	75 — 79 xd
1	Lisbon Electric Trams., Lim., Ord.	...	1⅛ — 1⅜
1	Do. 6% Cum Pref.	...	1⅛ — 1⅜
100	Do. 5% Mort. Debs.	— 2	89 — 94 xd
1	London and Suburban Trac. Co., Lim., Ord.	— 1/32	¼ — 5/16
100	London General Omnibus Company, Limited. 4½% Deb.	— 2	94 — 96 xd
100	Do. Do 5% Cum. Inc. Deb. Stk. Red.	...	86 — 88
100	London United Trms. (1901) Ltd., 4½ 1st Mt. Deb. Stk. Red	— 2	57 — 61 xd
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref.	...	4⅜ — 5¼
5	Do. do. 5% Deb. Stk., Red.	— 2	99 — 101 xd
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	— 2	79 — 82 ,,
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	+ 1	108 — 111
$1,000	Do. do. 5% Bds.	...	96½ — 98½
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref	...	⅞ — 1
100	Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red.	— 2	80 — 84 xd
100	Do. 5% Deb. Stock, Red.	...	86 — 89
100	Mexico Tramways Co., Common Stock	— 4	65 — 68
500	Do. Gen. Con. 1st Mort. Gld. Bonds	...	77 — 82
100	Do. 6% 50-yr. Mort. Bonds	— 4½	75½ — 78½ xd
...	Michigan United Railways 5% 1st Mort. Gld. Bonds	...	91 — 93
100	Montreal Street Railway, Sterling 4½% Debs. (1923)	...	99 — 101
100	Do. 4½% Sterling Debs, (1922)	...	98 — 100
...	National Steam Car Co. Ltd	— 3/32	13/16 — 15/16
10	Oldham—Ashton and Hyde Elec. Ord.	...	5⅞ — 6⅛
10	Do. do. 5% Cum. Pref.	...	5⅞ — 6⅛
5	Para Elec. Rlys. and Ltg. Co., Ord.	— ⅛	5½ — 6
5	Do. do. 6% Cum. Pref.	— 1/16	4⅝ — 5
1	Perth (W.A.) Elec. Trams. Ld., Ord.	...	1⅛ — 1⅜
1	Potteries Electric Traction Co., Ltd., Ord.	...	1/16 — 1/8
1	Do. 5% Cum Pref	...	1/16 — 1/8
100	Do. 4½% Debenture Stock, Red.	...	84 — 87
1	Provincial Tramways, Lim., Ord.	...	3/32 — 3/16
10	Do. 5% 1st Deb. Stock	...	95 — 98
...	Puebla Tramway, Light & Power Co., Prior Lien 5%	— 5/16	76 — 80 xd
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.	— 1/8	5 — 5⅛ ,,
100	Do. do. 4½% 1st Mt. Db. Stk.	— 2	94¼ — 96¼ ,,
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	84 — 87
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	— 2	97¼ — 99½ xd
100	Do. do. 5% 50-yr. Mort. Gold Bonds	...	90 — 92
10	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	...	97 — 100
$50	Do. 5% 1st Mort. Debs., Red., 1939	...	100 — 103
10	Shanghai Elec. Construction Co.	...	10 — 11
100	Singapore Elec. Tramways Lim., 5% Debs. Red	...	86 — 90
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref.	...	⅝ — ¾
10	Do. do. 4% Deb. Stk.	— 2	66 — 70 xd
...	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	93 — 95
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	97 — 99
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	— 2½	82 — 84 xd
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	92 — 95
5	United Elec. Tramways of Monte Video, Ord.	— 1/16	4⅜ — 4⅝
5	Do. do. 6% Cum. Pref.	...	4¾ — 5⅛
100	Do. do. 5% 1st Deb. Stk. Red.	...	93½ — 96¼
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	95 — 97
£	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	⅛ — ⅛
£	Do. do. 6% Cum. Pref.	...	3½ — 4 xd
100	Do. do. 4½% 1st Deb. Stock, Red.	— 2	79 — 84 ,,

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone; No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

CITY OF BRADFORD.

The Bradford Corporation invite tenders for the supply and erection of the Surface Condensing Plant required for use in conjunction with a 5,000 kw. Live Steam Turbo-Generator.

Copies of the specification, general conditions of contract, and form of tender may be obtained from Mr. Thomas Roles, City Electrical Engineer and Manager, Electricity Offices, Town Hall, Bradford, on payment of the sum of one guinea. Additional copies of the specification may be obtained on payment of the sum of half-a-guinea per copy. The sums paid will only be refunded upon receipt of a *bonâ-fide* tender, with the return of all the documents in good condition, and after the tenders have been adjudicated upon.

Sealed tenders, on the form provided, must be sent, fully filled in, to me not later than 10 a.m. on Thursday, January 22, 1914, endorsed "Tender for Electricity Works—Contract 'R. 31.'"

The contract will be let subject to the Fair Contracts Clauses of the Bradford Corporation.

The lowest or any tender will not necessarily be accepted.

FREDERICK STEVENS,
Town Clerk.

Town Hall, Bradford,
January 6, 1914.

COUNTY BOROUGH OF BURNLEY.

TRAMWAYS DEPARTMENT.

The Tramways Committee invite tenders for the supply of the following Sundry Stores and Raw Material, used in maintenance, for the year ending March 31, 1915, viz.:—

Brake Blocks.
Brass, Gunmetal, etc. Castings
Brushes, Washleathers, Chamois, etc.
Stockinette Mutton Cloths and Ship's Linen.
Cast Iron.
Ironmongery.
Iron and Steel.
Timber.
Nuts, Bolts, and Washers.
India-rubber.
Car Painters' requirements:—
Oils, Colours, Varnish, Brushes, etc.
Oils, Grease, etc.
Chemicals.

Particulars and form of tender, together with a copy of the contract to be entered into, may be obtained, and samples of stores and material inspected, on application at the Queen's Gate Depôt, Burnley.

Tenders, addressed "Chairman of the Tramways Committee," must be delivered at my office not later than 10 a.m. on Thursday, the 29th inst.

The contract provides for and will be made subject to the payment of the standard rate of wages to all workmen employed in and about the execution of the contract.

PEREGRINE THOMAS,
Town Clerk.

Town Hall, Burnley
January 8, 1914.

COUNTY BOROUGH OF CROYDON.

TRAMWAYS DEPARTMENT.

TENDERS FOR SUPPLY OF GENERAL STORES AND GOODS.

Notice is hereby given that the Council are prepared to receive tenders for the supply if and to the extent ordered by them of General Stores and Goods for their Tramways Department for the year ending March 31, 1915, particulars whereof are set forth in schedules marked "A" to "M" inclusive, printed copies of which may be obtained on application to the Tramways Manager, Tramways Depôt, Thornton Heath, Surrey.

Schedules, forms of tender (upon which alone tenders will be received), with particulars and conditions of contract, may be obtained from the Tramways Manager, at the above address, and where samples are to be tendered to, these samples are exhibited for examination at the Tramways Depôt aforesaid.

Sealed tenders (filled up as directed, and which will only be received subject to the schedules, particulars, conditions of contract and form of tender) must be endorsed "Tender for General Stores (Tramways Department)," and delivered to me not later than 10 o'clock in the forenoon on Monday, the 26th day of January, 1914.

The Council will only consider tenders from persons stating they have examined the exhibited samples, and do not bind themselves to accept the lowest or any tender, and reserve to themselves the right of accepting tenders either in whole or part, as they may think fit.

JOHN M. NEWNHAM,
Town Clerk.

Town Hall, Croydon,
January 1, 1914.

BEXLEY COUNCIL TRAMWAYS.

TENDERS FOR UNIFORMS.

Tenders are invited for the supply and delivery of the Uniforms required in connection with the Council's Tramway Undertaking.

Specifications, together with form of tender, may be obtained on application to the undersigned.

Sealed tenders, endorsed "Tramway Uniforms," must be delivered on or before 10 a.m., Wednesday, January 21, addressed to Thos. G. Baynes, Esq., Solicitor and Clerk to the Council, Broadway, Bexley Heath.

H. P. STOKES,
Elec. Engineer and Tramways Manager.

Electricity and Tramways Dept.,
Broadway, Bexley Heath.

BELFAST HARBOUR.

The Belfast Harbour Commissioners are prepared to receive tenders for the supply and delivery into the Harbour Workshops, Clarendon Dock, Belfast, of Electric Cables, in conformity to the outline specification and form of tender, which may be obtained from the Harbour Engineer, Mr. W. Redfern Kelly, M.Inst.C.E., from whom any further information required may also be obtained.

Tenders must be made on the special form provided for the purpose, and enclosed in sealed envelopes endorsed "Tender for Electric Cable," and must be addressed to me and delivered at my Office not later than Wednesday, January 28, 1914.

The Commissioners do not bind themselves to accept the lowest or any tender.

W. A. CURRIE,
Secretary.

Harbour Office, Belfast,
January 5, 1914.

TOWN OF SAINT HELIER.—ISLAND OF JERSEY.

The Authorities of the Parish of St. Helier (population 26,000) invite tenders for an exclusive concession for the supply of Electrical Energy for Light, Heating, and Power Purposes.

For conditions of tender and all information apply, Mayor, Town Hall, Jersey.

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BOROUGH OF LEIGH, LANCS.

Tenders are invited for the supply and erection of :—

One 1,500 kw. Turbo-Alternator (Impulse Type Turbine).
1,000 kw. Rotary Converter.
Transformers and Switchgear.

Specifications may be obtained for above from Mr. Arthur T. Smith, Borough Electrical Engineer.

Tenders to be addressed to the Chairman of the Electricity Committee, endorsed "Tenders for Electrical Plant," and delivered at the Town Hall, Leigh, not later than 1 o'clock p.m., on Friday, January 23, 1914.

The accepted tender will be subject to the usual sanction of the L.G.B.

W. H. COWBURN,
Town Clerk.

Town Hall, Leigh,
January 6, 1914.

COUNTY BOROUGH OF ROCHDALE.

ELECTRICAL ENGINEER'S DEPARTMENT.

Contract A85.—Engine Room-Extensions, New Boiler House, etc. (1914).
,, A86.—Turbo-Alternators (1914).
,, A87.—Turbo-Alternator Condensing Plants (1914).
,, A88.—Water Tube Boilers and Boiler House Equipment (1914).

The Electricity Committee of the above Corporation invite tenders for the supply, delivery, and erection at their Electric Power Station, Dane Street, Rochdale, of the above plant and buildings.

Specifications, quantities, etc., and forms of tender may be obtained from Mr. C. C. Atchison, M.I.E.E., Engineer and Manager, Dane Street, Rochdale, on receipt of a deposit of two guineas in the case of each contract, which will be refunded on receipt of the specification, etc., intact, together with a *bonâ-fide* tender. Additional copies of the specification may be obtained on payment of a further fee of half-a-guinea per copy, which will not be returned.

Sealed tenders on the prescribed form, endorsed as above, must be delivered to me not later than the dates specified in the general conditions for each contract.

The Corporation will not be bound to accept the lowest or any tender, and the placing of these contracts is subject to the Corporation obtaining sanction from the Local Government Board to borrow the necessary amounts therefor.

W. H. HICKSON,
Town Clerk.

Town Hall, Rochdale,
January, 1914.

(*Continued on page* 15.)

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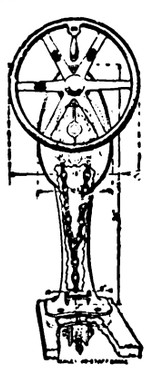

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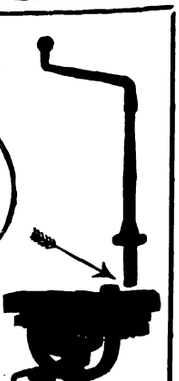

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THE
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SATURDAY, JANUARY 10, 1914.

THE "OCEAN"

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[HEAD OFFICE:]

MOORGATE STREET, LONDON, E.C.

BIRMINGHAM AND MOTOR OMNIBUS ENTERPRISE.

The name of Birmingham has been synonymous with progress in matters municipal. Mainly owing to the varying dates upon which the rights of the owners of the various sections of the tramways expired, the Midland capital was the last of the great cities to complete the electrification of its tramways, but the city will shortly stand an easy first as regards the importance of its motor omnibus organisation. As soon as Parliamentary sanction is secured for running omnibuses, the Council will acquire the interest within the city of the Birmingham and Midland Omnibus Company for the sum of about £30,000, the price having been arrived at by valuation. The company is an offshoot of the late Tramway Company, whose directors are entitled to the credit of having provided Birmingham and the surrounding populous areas with means of locomotion second only in extent to the undertaking of the London General Omnibus Company. The company have been tenacious of their rights, and two years ago they appeared along with the railways and private residents before a Parliamentary Committee in opposition to proposals for tramway extensions. By the acquirement of their undertaking the company and the Corporation will be relieved of the expense of the opposition that would no doubt have been offered by the former to the forthcoming application for omnibus powers. By acceding to the desire of the Tramways Committee to purchase their vehicles on the basis of a five years' life and a depreciation of 20 per cent. for each year of that life, together with the depot, the company have obtained facilities under certain conditions for still developing their services to towns within a 30-mile radius. There the accommodation will be welcomed and there will be no other form of traction to compete with. In course of time when the Corporation extend their tramways to certain outside localities with which agreements have been made, the omnibuses will withdraw from a few routes. A feature of the agreement under which the company will be given licences to connect up the centre of the city with their outside services is that the omnibus fares are as a minimum to be exactly double those charged by the Corporation from the centre to the outside, while the company have also agreed that on coming into the city they will not pick up passengers after crossing the boundary. Only one dissentient voice was raised on Tuesday last to the Tramways Committee's recommendation, and that speaker did not object to the Council running omnibuses; his remarks applied to the purchase of the company's vehicles in lieu of acquiring new stock. The company need have entertained no fear of adverse results through having to levy the double fare within the boundary, for experience in London and elsewhere shows that people are willing to pay more for a through journey on one vehicle, even if, as happens on the Metropolitan routes, the advantage gained in time does not exceed two minutes. One advantage of the higher fares will be to give a return more commensurate with the greater cost of operation, which was referred to as amounting to 25 per cent. more than tramway traction. Presumably the company may, if they choose, charge through passengers a lower fare for the portion of their journey that lies without the city. Congratulations may be offered to the Tramway and Watch Committees upon the successful result of their prolonged negotiations with the company. With the vehicles they already possess and the 30 to be acquired from the company, the Tramways Committee will now be able to demonstrate that the two forms of locomotion may be successfully worked in combination, and with so experienced a manager as Mr. A. Baker to formulate the scheme and to direct its working there can be no doubt that the result will be advantageous to the city, instructive to other municipalities, and an encouragement to the omnibus-building industry.

BRISTOL TRAMWAYS COMPANY'S COMPOSITE OMNIBUS.

L.G.O. APPLY FOR PERMISSION TO COPY THEIR DESIGNS.

Mention has before been made in these columns that the Bristol Tramways and Carriage Company construct all their motor omnibuses at the works at Brislington. So far the company have been compelled to utilise all their plant and equipment in supplying their own requirements, and as many as thirty were built during last summer and autumn. The type of omnibus used in Bristol has attracted much attention from outside. Not only has a request been made by the London General Omnibus Company for plant and permission to build the vehicle designed by Mr. Charles Challenger and known as the "Composite," but the Bristol Tramways Company have been asked if they could supply a fleet of omnibuses for an important Yorkshire town. Bristol claims to possess a better omnibus as regards comfort, speed, and safety, than any other city. There are over fifty omnibuses in service on the Bristol routes, and others are being built as quickly as possible, for Mr. Challenger, the traffic manager, has in contemplation the opening up of several other country districts as well as an augmentation of the present services. So far there has been a remarkable immunity from accident in connection with the traffic, and this fact is not only evidence of the excellence of the vehicles, but of the skill and care of the drivers. The question is often asked, why not follow the example of London and other places and use the type of 'bus that provides seats on an upper deck. The reason is that Bristol is too hilly for such a vehicle. The first service was instituted in 1906, and within the past three years the routes have been extended by 60 miles. The fifteen routes include Tramway Centre to Clyde Road; Tramway Centre to Ashley Down *vid* Old Market Street and Sussex Place; Old Market Street and Fishponds Causeway, passing through Whitehall and Croft's End; Hotwells and Long Ashton, recently

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extended to West Town in the one direction and Nailsea in the other; Old Market Street to Barton Hill; Tramway Centre and West Street, Bedminster, *viâ* St. John's Lane; Tramway Centre and Ashton Gate, *viâ* Bristol Bridge and Coronation Road; Tramway Centre and Winterbourne, *viâ* Milk Street and Eastville; Durdham Down and Tockington, *viâ* Filton; and Tramway Centre and New Clifton. The omnibuses are used to link up during the summer months the tramway services which end on the Bristol side at Brislington and on the Bath side at Newton St. Loe. Mr. Challenger states that he will not be content until every suburb and country district where there is a substantial residential population is served from the centre of the city, either by omnibus direct or car and omnibus combined. The popularity of the omnibus is attested by the fact that during the last week in 1913 over 109,000 passengers were carried on the various services.

SUGGESTED LIVERPOOL TRAMWAY TUNNEL.

Mr. C. W. Mallins, general manager, Liverpool Corporation tramways, on January 2 presented to the Tramways Committee a report on the overcrowding which takes place during the rush hours. These hours, he states, only extend to three and a half each day, and to ensure a seat for all would involve the placing of 120 additional cars on the service, and employing that number of drivers and conductors, together with 70 shed assistants, for all of whom useful employment could only be found for the 3½ hours, but who would have to be paid full time at the minimum rate of pay at least. This would necessitate an additional annual expenditure of £57,068, without any corresponding increase in revenue. To remedy the trouble, or at any rate minimise it, Mr. Mallins suggests increasing the seating capacity of all future cars built. The present congested state of the central part of the city would provide a difficulty in operating an additional number of cars, and for the purpose of overcoming this he makes some important suggestions. One of these is the construction of a third tramway route to the Pierhead, after widening the streets in the central area. An alternative scheme, with great possibilities, is the provision of a subway from the Old Haymarket to the Pierhead, equipped with the necessary appliances to enable passengers to enter and leave the subway at convenient stages without difficulty. Either of these propositions, he observes, would involve considerable capital expenditure, but the traffic congestion problem is becoming so urgent that a solution cannot be much longer delayed.

The committee, Mr. Mallins suggests, might take a more comprehensive view of the question of the cross-river traffic and consider whether the time has not arrived when all the authorities on both sides of the river might be invited to co-operate in the provision of a highway to connect the communities constituting the Mersey city by the construction of either a bridge or a tunnel. In regard to the bridging proposal, he quotes some statistics concerning the construction of the Brooklyn and Manhattan Bridges at New York. In reference to the suggested tunnelling of the Mersey, he refers to the utility of the suggested subway from Old Haymarket. This, he observes, while solving the congested traffic problem in the central area of the city, could be continued under the Mersey to the Cheshire side, terminating at a convenient point in Seacombe. If considered necessary, a branch could also be constructed to a point near Hamilton Square, Birkenhead, and this at some future time might be continued across the Wirral Peninsula to the River Dee, thus linking up the residential districts of West Cheshire with the centre of the City of Liverpool. A bridge would not relieve the traffic in the centre of the city if constructed from a point near St. George's Crescent, and if carried to the neighbourhood of Lime Street it would, he considers, be much more expensive than a tunnel, involving an approximate outlay of between five and six millions. His estimate of the cost of a tunnel two and a half miles in length is about £3,000,000.

The report was received by the committee, and was ordered to be sent to the other members of the Council.

The City Council on January 7 unanimously resolved to appoint a committee to confer with representatives of adjoining boroughs, rating authorities, and the Mersey Docks and Harbour Board, on the question of improving the means of transit across the Mersey either by bridge or tunnel. Sir Harmood Banner, who moved the resolution, said that the feeling evoked by Mr. Mallin's report was quite satisfactory, as showing that the people would like to see either a bridge or tunnel. A bridge would be more costly than a tunnel, and would afford less facilities.

It is stated that an American syndicate has approached the Corporation and other municipalities, the Mersey (Tunnel) Railway Company, the Overhead Railway Company, and other interests upon an extensive proposal for the construction of underground electric railways.

Second Shelter on the Thames Embankment.—In order to deal more promptly with the rush-hour traffic at the Blackfriars Bridge end of the Victoria Embankment, the Highways Committee are seeking the sanction of the City of London Corporation to the erection of a second shelter. The existing shelter is 100ft. in length. It is proposed to erect the second shelter in three parts to the west of Carmelite Street. The new shelter is designed to be 105ft. in length, and 7ft. in width. It will be exactly similar in construction to the existing structure, which will be 264ft. to the eastward.

ABERDEEN MANAGER'S CHANGE-HOLDING DEVICE.

Mr. R. S. Pilcher, general manager of the Aberdeen Corporation tramways, has invented a money-changing device for the use of conductors. The instrument comprises five brass clips attached to a solid base of the same metal, and is fitted on the top of the metal case which contains the rolls of tickets. The clips are capable of safely holding coins, from the size of a sixpence to a penny, and are kept closed by means of spring hinges. In the first clip 5d. is placed, in the second 11d., in the third 1s. 11d., in the fourth 2s. 5d., and in the fifth 4d. The conductor has thus at his hand change, where a penny fare is required, for a sixpence, shilling, two shillings, and half-a-crown, and in the last clip he has change for a sixpence when two penny fares are required. When three or four fares, as the case may be, are paid for by the one coin, the conductor has only to subtract a few coppers from the necessary clip, and he has the proper amount of change immediately. The clip is easily replenished during the intervals between stopping places. The device is now in use on the George Street route, and the conductors are unanimous in its praise.

MISCELLANEOUS NEWS AND NOTES.

Discount Tickets.—It has been decided to issue fourteen discount tickets at the price of twelve on the Preston Corporation tramways.

Cars on Order for Nottingham.—Replying to complaints of overcrowding, Councillor Swain, the chairman of the Tramways Committee, said that 20 new cars were on order.

Birmingham Corporation Bill.—A town's meeting on January 7 authorised the Council to make application to Parliament for powers to provide and run motor omnibuses and to construct tramways.

Trail Cars Authorised at York.—The Board of Trade have authorised the use of trail cars on the tramways for workpeople's traffic between 5.30 a.m. and 8 a.m.; for dinner hour traffic from 11.30 a.m. to 2 p.m.; and also between 4.30 p.m. and 6 p.m.

No Workmen's Cars with Penny Maximum Fares.—By 20 votes to 6 the Dundee Council rejected a motion made by Councillor Fletcher in favour of the reintroduction of workmen's cars, which were abolished on the introduction of the penny maximum fare.

Another Agreement with the London General Omnibus Company.—A working agreement of a tentative nature, which it is hoped will become permanent, has been adopted between the London General Omnibus Company and the National Steam Omnibus Company.

Mexico Tramways Company.—The Financial Minister of Mexico has forwarded to Dr. F. S. Pearson, the president of the company, a telegram from the President of Mexico denying the rumours that the Government were annulling the concessions of the company. General Huerta adds that the company's rights are being respected.

Bournemouth Council to Run Omnibuses.—On January 6 the Corporation adopted a recommendation presented by the Tramways Committee, after consideration of the manager's report, for application to be made to the Board of Trade for sanction to borrow £4,000 for the purpose of running motor omnibuses in connection with the tramways on three routes.

Radiators in Cars.—In reply to a suggestion that tramcars should be fitted with radiators for heating by electricity, a representative of the London County Council tramways has stated that there are so few really cold days that it has not been considered advisable to go to the expense. It would require a year for the purpose of fitting up the 1,725 cars.

Medals for Twenty Years' Service.—Entries are being received by the Glasgow tramways manager for a competition for the best design of badge to be given to motormen and conductors with twenty years' service. The list will be closed at the end of January. About 150 men who are qualified for the decoration have been in the service since the tramways became municipal property.

Denial of the Wolverhampton Strike Ballot.—The secretary to the tramway employees' union has denied the report that the men have been balloted on the question of striking. He states they have no desire to strike, because there is no grievance or difference between the management and the employees, and they feel that their applications will always continue to receive proper consideration.

Traction Developments at Chesterfield.—In connection with the railless traction powers secured by the Council last year trials of the respective routes are to be made with motor omnibuses before the installation of overhead equipment for railless vehicles is embarked upon. The Corporation have on order a fleet of six Daimler omnibuses of the type in use in the outskirts of Sheffield, and these are promised for delivery in the spring. The power station is to be enlarged and the plant increased, and the car-shed is to be extended to provide accommodation for the new omnibuses and three double-deck cars.

Success of Dinner Hour Fares at Darwen.—Mr. F. J. S. Hosken, general manager and engineer to Darwen Corporation Tramways, has presented a report on the three months' working of cheaper fares, and the committee have decided to adhere permanently to the fares. An increase of 26.75 per cent. in the receipts between the hours of 12 noon and 2 p.m. has resulted from the dinner hour tickets. Deducting the general increase of 8.7 per cent. over the whole system during the previous six months, the increase is 18.05 per cent. Extra cars have been required to deal with the increased traffic, but after allowing for this the extra cars return a profit of 5.15d. per car-mile. The all-round net increase in favour of the new cheap return tickets and dinner-hour tickets is 13 per cent.

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Illuminated Numerals for Potteries Cars.—The Potteries Electric Traction Company have decided to place on the fronts of the cars distinctive numbers for each route capable of being illuminated at night.

Board of Trade and P.A.Y.E. Cars.—The Board of Trade have intimated to Aberdeen Tramways Committee that they offered no objection to the continued use of the pay-as-you-enter cars, and the amendment of the regulations and by-laws.

Discouraging Cars Running into a Station Yard.—Walthamstow tramways department recently applied to the Great Eastern Railway Company to allow the tramways to be extended into the station yard at Hoe Street, but the company have suggested that the tramway should run down into Selbourne Road. Powers to carry out the suggestion will probably be applied for in the next Provisional Order.

Aberdeen Suburban Tramways Company's Agreement.—The directors of the company have asked the Town Council to amend the agreement between the company and the Corporation, especially with reference to the payment by the latter of 3¼d. per car-mile for traffic expenses and rolling stock charges. The company ask for an increase in the amount, and a sub-committee has been appointed to consider the matter.

Large Outlay to be Made at York.—The Council decided on January 5 to apply to the Board of Trade to extend the limit of the amount which the Council are authorised to borrow by the York Light Railways Order, 1908, and the Extensions Order, 1912. The amount by which the limit is proposed to be extended is £71,650, which is required for car sheds, dwellings of employees, and new offices for tramway and electricity purposes.

Torquay Traffic Returns.—Mr. H. Holliday, manager of the Tramways Company, has prepared a statement showing the following traffic totals for the past three years: 1913, 4,832,684 passengers; 1912, 4,207,619; 1911, 3,504,317. Calculating the population of both Torquay and Paignton at 48,000, the number of passengers carried last year works out at more than a hundred times that number. The receipts last year were £32,211, as against £28,111 in 1912.

Bristol Council and Tramway Purchase.—By a large majority the Bristol Corporation on January 7 agreed to the promotion of a Parliamentary Bill to enable them, if and when they shall so decide, to work tramways and by agreement to purchase or take on lease any tramways or portions of tramways not purchasable by the Corporation in 1915. Approval was also given to the provision made in the Bill to take a poll of the ratepayers upon the question of the acquisition of the tramways.

Blackburn Municipal Strike.—At Blackburn Town Council meeting on Thursday the Mayor announced that he had received a resolution passed by the town's meeting asking him to convene a conference for the settlement of the municipal strike. In view of the considerable inconvenience and financial loss suffered by the townspeople as a result of the dispute, he had decided to accede to the request and would call an immediate conference of representatives of both sides. The council unanimously commended the Mayor for his action.

The Institution of Automobile Engineers.—A meeting of the Institution of Automobile Engineers will be held on Wednesday, January 14, at the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, S.W., at 8 p.m., when a paper will be read by Mr. A. Ludlow Clayden, entitled "The Economics of Design" (the market and the design for a low-priced four-seated car). Cards of invitation may be obtained on application to the Secretary, 13, Queen Anne's Gate, S.W., and an invitation is extended to those interested.

Replacing Standards with Rosettes.—In order to remove the tramway standards from the centre of Union Street, Oldham, the tramways manager has been negotiating with the owners of properties to permit rosettes to be affixed to their premises. As most of them refuse he has obtained the consent of the committee to give an object lesson by removing the standards at the Clegg Street corner and the one opposite the Technical School. He is in hopes that when people see how great an improvement it makes and how much more convenient it is for the traffic they will be more ready to assist the Corporation to remove the other standards.

Bridge-Opening Indicator at Hull.—The city engineer has reported that he had further considered the question of signalling to the City Square when the bridges were about to be opened, and the most feasible scheme seemed to be an electric sign which would indicate when a bridge was about to open, and show when it was open. He estimated the cost at about £400. The tramways manager, replying to questions, said the experimental arrangement now in use was working very satisfactorily. It was decided to refer the matter to a sub-committee. The question of a school for the training of motormen was referred to the chairman (the Mayor), deputy-chairman (Mr. W. Wheatley), the tramways manager, and the engineer (Mr. Wilkinson).

Omnibuses Suggested for South Shields.—Reporting on a suggestion for making a riverside extension of the tramways from Tyne Dock by way of Temple Town to the Mill Dam, Mr. W. T. Robson, the tramways manager, says it would practically mean paralleling another route, at a cost of £17,000. He suggests that a motor omnibus service should be established, as the cost would be very small in comparison with the tramways scheme, and no great harm would be done if the route was found not to be productive. It would be necessary to purchase three omnibuses in order to serve the route, the cost of which would be, approximately, £800 each, and a car shed extension or garage would also be required. The Tramways Committee recommend the Council not to entertain the proposal for an extension of the tramways.

Turn of the Tide at Ashton and Hurst.—Since the new lease was arranged towards the end of 1912 for inter-running between the Ashton and Hurst tramway authorities, under which Hurst ratepayers were called upon to pay interest and sinking fund on their own section, amounting to about £830 per annum—which had previously been met by Ashton—the Hurst tramways have had an unprecedented run of posperity. The number of passengers carried during the year was 1,231,486. Apart from the interest and sinking fund the section has been worked for the first time at a profit.

New Cars for Preston.—The Tramways Committee have authorised the engineer to prepare drawings and obtain tenders for the supply of six new cars in order to meet the requirements of the increasing traffic. As the original car shed does not allow of extension the cars when obtained will be allowed to remain in the open at night until authority has been obtained to erect new offices and car shed and garage accommodation. These provisions are included in the application to be made to Parliament next session. Powers are also asked for to construct additional tramways and to run omnibuses.

Extensions for Nottingham.—The City Council have agreed to extend the tramways from Derby Road to Wollaton Park, and also on the Sherwood and Carlton Road routes. The schemes have received Parliamentary sanction. Councillor Swain, the chairman of the Tramways Committee, stated that the Derby Road route had been inspected by the managers of the Manchester and Leeds tramways, who expressed a very strong opinion that the extension would pay. In reply to a suggestion, Councillor Swain agreed to recommend the committtee, when the Derby Road extension was made, to run a motor omnibus service from the new terminus to Dunkirk.

Tramway Offices and Shelters at Leeds.—At a meeting of the Corporation on January 7 assent was given to a proposal by the Tramways Committee to send a sub-committee to visit Bradford and Sheffield, for the purpose of inspecting tramway office accommodation. Replying to an objection Alderman Wilson said they did not wish to force the department into the Leeds market building against the wishes of the committee. For a proposal that four members of the committee should visit a few towns to see the designs of tramway shelters the voting was equal, and the Lord Mayor passed to the next business. A resolution was adopted to promote a Bill for tramway extensions.

More Omnibus Licences Granted at Oxford.—The Corporation on January 7 adopted a recommendation by the Watch Committee to license 24 more vehicles, 12 each to the Tramway Company and the Oxford Motor Omnibus Company. The Mayor, in moving the adoption of the recommendation, thought they had no power to grant a monopoly. Mr. Morris, on behalf of the omnibus company, had offered to pay a rent of £800, but they could not take that under the existing law, and even if they could it was not enough. They were receiving a rent of £800 from the Tramway Company, who were paying rates to the tune of £400, and at the same time were paying for the upkeep of a very large area of roads.

Leicester's Claim Regarding a Wind Screen.—The Tramways Committee have made an agreement with Mr. G. Morris, under which they are at liberty to use a wind screen designed by him At the January meeting of the Council the question was asked whether the committee could not get screens from the large firms manufacturing them. Alderman Flint replied that they had given special consideration to this matter, and they did not believe there was one in existence equal to the one they had got now. It was not only useful, but good-looking. It had been brought out by one of their own employees, and they had secured the right from him to lay down as many as they required.

Northampton Adopts Birmingham's Type of Car.—The Tramways Committee reported at the January meeting of the Council that they had considered designs of new cars with covered tops and vestibules, and had decided to provide seven cars with covered tops and vestibules. Replying to questions, Councillor T. D. Lewis, chairman of the committee, said the question of bogie trucks had been considered carefully, but the view was that, having regard to all matters that had to be considered the lighter car was best suited to Northampton. Recently he saw at Preston 100 cars of the type they proposed to order. Those cars were for the Birmingham City Council, so that if Northampton was making a mistake Northampton was in good company. Light cars were advisable in certain towns.

Disappearing Horse Tramcars and Omnibuses.—Only three horse omnibuses are now running in the London fleet of Thomas Tilling, Limited. Six were taken off the Penge-Beckenham service during the first week of the New Year. Sir Laurence Gomme, in the annual report of the London County Council to March 31 last, mentions that in 1903 the horse-drawn cars numbered 517. Last year there were only 74 running, and that number is fast reaching extinction. Electric cars, introduced in 1904, when 306 were running, had increased to 1,676. In the same ten years the number of passengers increased from 100 millions to 512 millions, and the revenue from £444,000 to 2¼ millions sterling. The report mentions that the omnibus was first used in London in 1829, when it was introduced from Paris. The fare from Marylebone Road to the Bank was a shilling. Now the same distance can be covered in less than half the time for twopence. In 1833 two steam vehicles were introduced, and ran regularly for a time between Paddington and the Bank, and along the Stratford and Islington Roads.

Double-Deck Railless Car Demonstration.—The R.E.T. Construction Company's double-deck railless trolley-car is now in operation on the special route installed between St. Peter's Church and Preston Circus, Brighton. On January 6 the Mayor and a number of members of Hove Council made an inspection

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under the guidance of Alderman Wilson, chairman of the Brighton Tramways Committee, and Mr. W. Marsh, the tramways engineer. Mr. Munro, of the R.E.T. Construction Company, who was also present, is the designer of the car. Alderman Clark, of Hove, who is connected with the local motor omnibus company, put numerous questions to the engineer. Tramcars run on the same route, and during one trip the railless car passed a tramcar. The trolley-arm of the latter was removed from the wire and the railless car with its two arms went by with ease. Demonstrations were also afforded of the ease with which the car can be pulled up suddenly and run from side to side of the road. The thoroughfare was very muddy, but, although the vehicle was travelling at a speed not far short of twenty miles an hour, there was no indication of side-slipping nor of the trolley-arms leaving the wires.

CONTRACTS AND ORDERS.

Edgar Allen and Co., Sheffield, have received an order from Southend Council for the supply of points and cross-overs.

Rotherham Council have accepted the tender of Hadfield's Steel Foundry Company for special work for the Fitzwilliam Road track at £285.

Edinburgh Omnibus Tenders.—The Tramways Committee on January 6 remitted to the burgh engineer for report the tenders for the motor omnibuses which are to be run on several routes.

Burnley Council have placed a contract with the British Westinghouse Company, Limited, for plant for the new station, £2,864; and with the British Insulated and Helsby Cables, Limited, for cable.

The Italian State Railways have placed orders for the supply of 41 electric locomotives with the Italian Wêstinghouse Company, for 18 with the Tecnomasio Italiano, and for 18 with the Costruzioni Meccaosche di Saronno.

Mr. Bertram Thomas has received a contract from Salford Council for extensions in connection with the lighting and power switchboard, and for the supply of an additional circuit-breaker for the temporary traction switchboard.

Hull Tramways Committee have adopted a recommendation of the manager that 100 breast punches be hired for twelve months as an experiment, as the old hand punches were becoming defective. The new punches are worn on the breast of the conductors.

Six More P.A.Y.E. Cars for Aberdeen.—On January 5 the City Council adopted the recommendation of the Tramways Committee for the acceptance of the tender of the Brush Engineering Company for the construction of six pay-as-you-enter cars at £2,490. This tender was the lowest.

Bedford Council have allotted contracts as subjoined:—Turbine, alternator, etc., British Westinghouse Company, £5,038; boiler, fittings, and settings, Stirling Boiler Company, £1,146; superheater, the Superheater Units, Swansea, £115; mechanical stoker and coal-handling plant, T. and T. Vicars, £868.

Doncaster Council have accepted the following tenders:—Feeder panels, Crompton and Co., Limited, £169; high tension main switchboard and regulator, Siemens Bros. Dynamo Works, Limited, £1,019; panels for rotary converters, British Westinghouse Company, Limited, £193; exhaust piping, Willans and Robinson, Limited, £177.

The Peckham Truck Company, of Queen Anne's Chambers, Westminster, S.W., have during the past year received orders for long wheel base pendulum radial trucks, which have recently been described in these pages, from over twenty tramways in the United Kingdom. The reports received from a number of these lines where the trucks are in use indicate that they are proving satisfactory, and in several cases second and third orders have already been received.

PERSONAL.

Mr. Henry Mattinson, A.M.Inst.C.E., permanent way engineer to the Manchester Corporation tramways, has been appointed chief civil engineer to that department, under an agreement for four years, at a salary of £500, rising to £600 per annum. Mr. Mattinson recently accompanied Mr. McElroy, the general manager, on a tour to the principal cities of the Continent, United States, and Canada, to study the methods of dealing with local passenger transportation in those countries, the congestion of traffic in Manchester calling for urgent attention.

Salford Appointments.—The following appointments have been made in the tramways department:—Mr. W. Blakemore to be traffic superintendent, at £200 per annum, rising by two annual increments of £20 and one of £10 to a maximum of £250; Mr. C. F. Ellewood to be chief clerk of the traffic staff at £140 per annum, rising to a maximum of £200; Mr. H. Richardson, permanent way superintendent, has had his salary increased from £200 to £220, rising to £250 per annum maximum. Increases have also been granted to Mr. W. Billington, chief clerk of the general staff, Mr. R. Chadwick, car depôt superintendent, and Mr. H. Weston, overhead equipment superintendent.

Mr. G. F. Craven, general manager and engineer, Reading Corporation tramways, at the January meeting of the Council was recommended by the Tramways Committee, after considering the report on the working of the undertaking from December 1, 1912, to November 30, 1913, for an increase of his salary from £400 to £600 by four annual increments of £50, the first to take effect from January 1, 1914. At the Council meeting Councillor Watts (Labour) moved that the salary be raised to £450 without immediate provision for further increments. He considered the manager had carried out his duties to the satisfaction of the towns people in every way. Councillor Dormer, in seconding, associated himself with the reference to Mr. Craven's excellent services to the town and his efficiency. Councillor Bull (past chairman of the committee) thought the committee had dealt with the matter in a businesslike way, and he heartily endorsed the remarks concerning the way in which Mr. Craven had carried out his duties. Alderman Martin mentioned that several members were disposed to be more generous to Mr. Craven. The recommendation was only a very just action to a very able officer. Alderman Parfitt said the previous manager received £600, and the Council had fixed that as the standard. Councillor Venner thought they would be well advised to leave the salary at £450 for some time. The tramways might be obsolete in four years from now. The Mayor (Alderman Field), Chairman of the Committee, said that he had no doubt that when the tramways had become obsolete Mr. Craven himself would be obsolete. The committee considered the question some years ago, and came to the conclusion that £600 was the salary to pay. Last year Mr. Craven was appointed on probation, and during that time he had given the very greatest satisfaction. The Council were very disturbed at losing Mr. Binns, but they now had a man who under Mr. Binns had obtained a most intimate knowledge of the undertaking. A progressive salary secured the man receiving it for many years in all probability; it also had the advantage of not coming up for consideration so frequently. In Mr. Craven they had the right man in the right place. Councillor Rabson (Labour) said when the late manager went away the Council considered that £600 was a fit salary, and he could not support a resolution that Mr. Craven should have less than his predecessor. He was pleased to hear on all hands of the treatment the men received from Mr. Craven. Alderman Dryland explained that if the extensions were approved by Parliament next session, the manager in a few years would be responsible for a system almost twice the size of the present undertaking. Mr. Watts's resolution was lost by 29 votes to 4, and the recommendation was carried unanimously.

FINANCIAL REPORTS AND MEETINGS.

Lima Light, Power and Tramways Company.—A quarterly dividend of 1 per cent. is announced.

The British Electrical Federation.—The traffic statement for the week ended January 2, 1914, shows that the receipts from tramways and railways amounted to £38,373, as compared with £38,754 in the corresponding week last year, and from omnibuses £11,775, as compared with £1,322, making a total of £50,148, as compared with £40,076. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year, the receipts show a decrease of £539 upon the week.

Dublin Tramways Company's Dividend.—The directors of the Dublin United Tramways Company recommend the payment of a dividend at the rate of 6 per cent. per annum, less income tax, for the half-year ended December 31, on the preference shares of the company, and a final dividend at the rate of 5 per cent. per annum, less income tax, for the half-year ended December 31, on the ordinary shares. This makes, with the ad interim dividend paid on August 2, a dividend for the year on the ordinary shares at the rate of 5½ per cent. per annum, less income tax, after setting aside £7,000 towards the renewal of rails, and £3,000 towards the provision for renewal of cars, and carrying forward £9,958.

Manx Electric Railway.—Sir A. G. Boscawen, M.P., in moving the adoption of the report at the annual meeting, congratulated the shareholders on a record year, due to a great extent to the fine summer. Passenger receipts amounted to £36,642, as against £30,290 in 1912 and £32,545 in 1911, which latter was the previous best year. Goods, live stock, quarries and sundries brought in £3,518, as against £4,082 in 1912 and £3,468 in 1911. They carried 704,188 passengers, as against 574,187 in 1912, and 606,497 in 1911. Their mileage was 364,747, as against 325,647 in 1912 and 344,968 in 1911. They earned 24.11d. per mile run from the passengers, as against 22.33d. in 1912 and 22.64d. in 1911, and they carried 1.93 passengers per mile, as against 1.76 in the two previous years. The number of visitors to the island between May and September was 629,617, or 122,000 more than the previous year, and 78,000 more than in 1911. The working expenses were £18,740, as against £17,669. The increase was partly accounted for by the increased mileage, but chiefly by the fact that fuel was very much more expensive, and owing to the dry summer they had to run on steam to a greater extent than the year before. In spite of these adverse circumstances the ratio of working expenses to receipts was as low as 46.66 per cent., as against 51.4 per cent. in 1912 and 47,78 per cent. in 1911. After providing for the debenture interest and the interim dividends of the preference shares, they were left with a balance of £9,700, which they proposed to allocate as follows:—To the balance of the preference shares dividend, £3,580; reserve for special renewals, £2,000; dividend at the rate of 2 per cent. on the ordinary shares, £2,000; and to carry forward £2,179.

WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended January 3 amounted to £225,078, or £1,246 less than in the corresponding week last year, while the track mileage was 2,862, or 80 more than for the corresponding week. The receipts were at the rate of £78 10s. 2d. per track mile, a decrease of £2 14s. 11d. per mile as compared with last year.

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(*Continued from page* 10.)

LONDON—INDIA OFFICE.

The Secretary of State for India in Council is prepared to receive tenders from such persons as may be willing to supply

Wheels and Axles.

The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at that Office by 2 o'clock p.m. on Tuesday, January 27, 1914, after which time no tender will be received.

H. J. W. FRY,
Director-General of Stores.

India Office, Whitehall,
January 7, 1914.

CITY OF MELBOURNE, AUSTRALIA.

SUPPLY OF BARE HARD-DRAWN COPPER CABLES.

Tenders are invited for the supply of 5 ton 16 cwt. Bare Hard-Drawn Copper Cable.

Copy of specification, condition of tender and of contract, and form of tender, may be obtained on application to the undersigned.

Such application must be accompanied by a deposit of 5s., which will be returned on receipt of a *bonâ-fide* tender.

Tenders to be sent to the undersigned, endorsed "Tenders for Bare Hard-Drawn Copper Cable," and must be received by them not later than noon on Wednesday, January 21, 1914.

The Council reserves to itself the right, but does not bind itself, to accept the whole or any portion of any tender.

MCILWRAITH, MCEACHARN AND CO. PTY., LTD.,
Agents for Melbourne City Council.

Billiter Square Buildings, London, E.C.

COUNTY BOROUGH OF WEST HARTLEPOOL.

TRAMWAYS DEPARTMENT.

TENDERS FOR SUPPLY OF TICKETS.

Tenders are invited for the supply of tickets for the year ending March 31, 1915.

Specification and form of tender may be obtained from the undersigned.

Sealed tenders, marked "Tickets," must be delivered to the Town Clerk, Church Street, West Hartlepool, not later than 12 noon on Wednesday, January 21.

The Corporation do not bind themselves to accept the lowest or any offer.

CHAS. BURGESS,
General Manager.

Tramways Depôt,
Greenland, West Hartlepool,
January 6, 1914.

COUNTY BOROUGH OF WEST HARTLEPOOL.

TRAMWAYS DEPARTMENT.

TRAMWAY EMPLOYEES' UNIFORMS.

Tenders are invited for the supply and delivery of Uniforms required for the year ending March 31, 1915.

Specification and form of tender can be obtained from the undersigned.

Tenders, marked "Tramways Uniforms," must be delivered to the Town Clerk, Church Street, West Hartlepool, not later than 12 noon on Wednesday, January 21.

The Corporation do not bind themselves to accept the lowest or any tender.

CHAS. BURGESS,
General Manager.

Tramways Depôt,
Greenland, West Hartlepool,
January 6, 1914.

COUNTY BOROUGH OF WOLVERHAMPTON.

TRAMWAYS DEPARTMENT.

Tenders are invited for the supply of Uniform Clothing for the Tramways Employees.

Form of tender, together with term of contract, may be obtained on application to Mr. W. A. Luntley, General Manager, at the Tramway Offices, Cleveland Road, Wolverhampton.

Tenders, addressed to "The Chairman of the Tramways Committee," to be delivered at my office not later than noon on Wednesday, January 28, 1914.

The Corporation do not bind themselves to accept the lowest or any tender.

HORATIO BREVITT,
Town Clerk.

Town Hall, Wolverhampton,
January 6, 1914.

POSITION VACANT.

TRAFFIC MANAGER'S ASSISTANT.

Traffic Manager's Assistant wanted for Tramway Company near London. Only energetic, well educated, and experienced gentlemen need apply. Commencing salary £110, but every encouragement will be given to the right man.

Apply, giving full particulars, to Box No. 51, TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.

POSITION WANTED.

TRAMWAY MOTORMAN.

Tramway Motorman (Scotch), thoroughly experienced, desires change to some English tramway system. Would like situation as motorman on electric railway system. Abstainer. 25. Address, No. 33, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.

COPPER AND ALUMINIUM MARKET.

January 9, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

	Friday, January 9.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	63 0 0	64 15 0	74 15 0
,, ,, (three months)	63 7 6	65 7 6	75 5 0
Electrolytic Copper—bars or ingots	67 0 0	68 5 0	81 15 0
Aluminium—bars or ingots	83 0 0	83 0 0	88 0 0

COAL MARKET.

January 9, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

	Friday, January 9.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	s. d.
Best Admiralty Welsh (large)	24 6	25 6	24 0	23 3
Best Seconds	23 6	24 0	23 6	23 0
Ordinary Drys	22 0	22 6	22 3	21 0
Best Washed Nuts	21 0	21 0	21 0	20 0
Best Washed Peas	19 6	19 6	20 0	18 6
Cardiff, f.o.b.—				
Best Admiralty (large)	20 0	21 0	18 9	18 3
Best Seconds	19 0	19 6	18 3	18 0
Ordinary Drys	17 6	18 0	17 0	16 0
Best Washed Nuts	16 6	16 6	16 3	15 0
Best Washed Peas	15 0	15 0	14 9	13 6
Newcastle, f.o.b.—				
Best Steams	15 0	15 3	15 3	13 0
Best Seconds	13 6	13 0	14 0	12 0
Smalls	6 9	7 0	11 6	7 3

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregate. Wks.	Aggregate. 1913-4.	Increase or Dec.
Anglo-Argentine	Dec. 23	£57,159	£59,432	51	£2,849,055	+£205 679
Auckland (28 days)	Nov. 21	19,174	10,497	21	92,254	— 4,949
Ballarat and Bendigo	October	444.6	4,356	30	26,988	— 605
Brazilian St. Rly. Mirs.	Nov.	44,278	53,642	17	207,214	+ 85,673
Brazilian Traction	Dec. 27	84,911	97,642	...	...	...
Brisbane	Dec.	25,890	29,145	52	3'6 216	+ 61,905
British Columbia $	Nov.	741,876	746,152	22	3,760,557	+ 283,424
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacroze	Dec.	47,188	47,624	26	272,894	+ 9,337
Calcutta Rs.	Jan. 3	70,718	71,942	1	71,942	+ 1,224
Cape Town	Nov.	...	12,555	...	...	...
Carthagena & Herreria	Dec.	3,001	2,698	52	30,863	+ 4,517
Cordoba	Nov.	12,193	13,447	35	107,457	+ 10,471
East India	Dec.	1,842	2,046	22	9,879	+ 349
Kalgoorlie	Nov.	2,861	2,504	48	31,603	— 8,001
La Plata	Dec.	5,862	5,680	52	61,520	+ 9,344
Lima	Sept.	22,660	34,110	39	300,647	+ 23,783
Lisbon Mirs.	Sept.	...	144,538	...	...	...
Madras (14 days) Rs.	Dec. 31	29,482	30,800	52	644,192	+ 46,109
Melbourne	Dec.	...	69,000	...	...	...
Mexico $	Nov.	565,239	605,467	48	6,337,805	+ 177,861
Montevideo	Dec.	34 483	33,309	9	68,839	— 267
Para	Jan. 4	4,321	3,485	5	16.841	— 3,193
Port Elizabeth	Nov.	...	3,530	...	...	...
Shanghai $	Dec. 31	18,211	22,800	52	1,179,358	+ 141.551
Singapore $	Jan. 3	10,135	11,357	1	11,357	+ 1,222
Toronto $	Nov	742,156	849,279	48	8,893,984	+1,176,680
Winnipeg $	Nov.	345,031	360,682	48	3,698,831	+ 295,148

DICK, KERR & CO.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.

Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1912-3.	1913-4.	Incr. or Dec.	Aggregate. Wks.	1913-4.	Increase or Dec.
Aberdeen Corporation..	Dec. 31	£1,749	£1,640	— £109	31	£50,692	+ £3,003
Accrington Corp.	,, 31	590	598	+ 18	39	22,752	+ 2,018
Ayr Corporation	Jan. 3	272	276	+ 4	33	13,470	+ 1,899
Bath Electric	Dec. 24	903	885	— 18	52	49,319	+ 3,865
Birkenhead Corp.	Jan. 4	1,295	1,357	+ 72	40	51,998	+ 4,923
Birmingham Corp.	,, 3	11,490	11,986	+ 496	40	474,327	+ 40,626
Blackburn Corporation	Dec. 31	1,367	1,322	— 45	40	52,396	+ 4,717
Blackpool Corporation	Jan. 1	751	786	+ 35	39	76,979	+ 12,136
Bolton Corporation	,, 4	3,185	3,314	+ 129	40	110,385	+ 6,231
Bournemouth Corp.	,, 7	1,633	1,624	— 9	40	85,633	+ 9,467
Bradford Corporation..	,, 3	5,508	5,456	— 52	39	237,505	+ 13,923
Brighton Corporation..	,, 4	864	838	— 26	40	44,932	+ 2,977
Bristol	,, 2	7,921	8,624	+ 703	52	419,539	+ 54,605
British Elec. Federatn.	,, 2	40,076	50,148	*	...	...	...
Burnley Corporation ..	,, 3	1,639	1,591	— 48	40	68,520	+ 7,534
Burton-on-Trent Corp.	,, 4	292	299	+ 7	40	11,899	+ 594
Bury Corporation	,, 4	1,369	1,361	— 8	40	54,426	+ 2,153
Cardiff Corporation	Dec. 20	2,577	2,606	+ 29	38	104,325	+ 10,972
Chatham and District..	,, 31	698	779	+ 81	52	48,232	+ 3,028
Chesterfield Corp.	Jan. 1	259	279	+ 20	39	10,336	+ 1,186
Colne & Trawden	,, 3	231	229	— 2	1	229	— 2
Cork Electric	Dec. 31	324	341	+ 17	52	25,980	+ 716
Croydon Corporation ..	,, 26	1,930	1,904	— 26	38	64,477	+ 6,034
Darlington Corporation	Jan. 3	249	267	+ 18	40	10 038	+ 941
Derby Corporation	,, 3	934	967	+ 33	40	39,551	+ 3,738
Dover Corporation	Dec. 27	224	210	— 12	39	9,859	+ 166
Dublin & Lucan	,, 31	253	267	+ 14	26	3,859	— 13
Dublin United	Jan. 3	5,894	5,057	— 837	1	5,057	— 837
Dundee City	Dec. 31	1,418	1,334	— 83	33	43,530	+ 3,139
East Ham Corporation	Jan. 3	1,164	986	— 178	40	41,155	— 1,981
Exeter Corporation	,, 2	328	309	— 19	40	13,889	+ 653
Gearless Motor 'Buses.	,, 3	...	491	...	1	491	...
Glasgow Corporation ..	,, 3	23,078	23,026	— 52	31	634,273	+ 45,673
Glossop(U.Elec.Supply)	,, 3	126	110	— 16	1	110	— 16
Halifax Corporation ...	Dec. 30	2,158	2,292	+ 134	39	83,759	+ 2,869
Hastings & District.....	Jan. 1	906	894	— 12	52	54,109	+ 3,787
Huddersfield Corp.	,, 3	2,086	2,011	— 75	40	85,526	+ 4,580
Hull Corporation	,, 3	3,204	3,389	+ 185	40	126,629	+ 6,518
Ilford U.D.C.	,, 3	443	419	— 24	40	18,142	— 946
Ilkeston Corporation ..	,, 7	106	116	+ 10	41	5,451	+ 815
Ipswich Corporation ..	,, 3	402	396	— 6	40	18,678	+ 719
Isle of Thanet	,, 3	314	302	— 12	14	5,079	+ 491
Kilmarnock Corp.	,, 3	241	247	+ 6	33	5,918	+ 394
Lanarkshire	Dec. 31	1,260	1,571	+ 311	52	89,775	+ 11,839
Lancashire United	,, 31	1,591	1,648	+ 57	52	81,543	+ 10,197
Leeds City	Jan. 3	7,848	7,723	— 125	40	324,824	+ 12,641
Leicester Corporation..	,, 3	2,726	2,830	+ 104	½	1,315	+ 200
Leith Corporation	,, 3	797	777	— 20	33	23,885	+ 1,089
Leyton U.D.C.	Dec. 25	1,436	1,432	— 4	33½	52,118	— 383
Liverpool Corporation..	Jan. 3	12,690	12,750	+ 60	½	6,180	+ 312
Llandudno & Colwyn B.	,, 2	185	182	— 3	5	749	— 13
London County Council	,, 1	41,996	40,512	— 1 484	38	1,663,570	+ 5,552
London Gnl. Omnibus..	,, 3	58,065	54,052	— 4,013	1	54,052	— 4,013
London United	,, 2	5,897	5,609	— 288	1	5 609	— 288
Lowestoft Corporation	,, 3	170	183	+ 13	13	2,616	+ 200
Maidstone Corporation	,, 1	197	202	+ 5	40	8,287	+ 579
Manchester Corp.	,, 3	17,412	16,812	— 600	40	704,164	+ 32,170
Met. Elec. Trys.	,, 2	8,902	8,649	— 253	1	8,649	— 253
Nelson Corporation	,, 3	199	219	+ 19	40	8 440	+ 475
N'castle-on-Tyne Corp.	,, 3	4,879	5,132	+ 253	40	196,765	+ 17,645
Newport (Mon.) Corp....	,, 3	770	745	— 25	40	30.969	+ 2,373
New St. Helens & Dist...	Dec. 31	862	821	— 41	27	22,538	+ 2,208
Northampton Corp	Jan. 2	573	587	+ 14	40	23,194	+ 1,473
Nottingham Corp.	,, 1	3,261	3,463	+ 202	33½	133,109	+ 5,935
Oldham Corporation ...	,, 4	2,008	2.045	+ 77	41	90,899	+ 6,507
Portsmouth Corp.	,, 3	2,029	1,933	— 96	40	92,423	+ 6,379
Preston Corporation ...	Dec. 31	854	857	+ 3	40	35,440	+ 2,175
Provincial	Jan. 3	1,701	1,762	+ 61	13	23,835	+ 1,556
Reading Corporation ..	,, 1	727	745	+ 18	39	27,875	+ 2,090
Rochdale Corporation	,, 3	1,544	1,501	— 43	40	64,574	+ 2 655
Rotherham Corp.	,, 7	833	1,022	+ 189	40	40,914	+ 8,774
Salford Corporation ..	,, 5	5,270	5,165	— 105	40	210.410	+ 9,585
Sheffield Corporation...	,, 6	7,479	7,546	+ 67	41	300.749	+ 22,815
Southampton Corp.	Dec. 31	1,196	1,026	— 172	39	52.734	+ 3,214
Southend-on-Sea Corp.	,, 31	657	648	— 9	40	33,705	+ 6,722
South Met. Trys.	Jan. 2	853	1,043	+ 190	1	1,043	+ 190
South Shields Corp.	,, 3	723	780	+ 57	40	29,053	+ 3,453
Sunderland Corp.	,, 4	1.467	1,595	+ 128	40	58,378	+ 5,561
Sunderland District ...	Dec. 31	646	654	+ 8	9	5.121	+ 452
Swindon Corporation ...	,, 31	181	169	— 12	39	6,640	+ 404
Trys. (M.E.T.) 'Buses	Jan. 3	...	7,964	...	1	7.964	...
TynesideTrys.&Tmrds	Dec. 31	430	508	+ 78	27	13,939	+ 597
Wallasey Corporation	Jan. 3	1 075	1,114	+ 39	40	49,174	+ 4,488
Walsall Corporation ...	,, 3	597	636	+ 39	1	202	— 55
Walthamstow U.D.C....	,, 3	684	701	+ 17	40	30,103	+ 1,128
Warrington Corp	,, 1	469	463	— 6	40	17,732	+ 473
West Ham Corporation	,, 1	2,746	2 636	— 110	39	108,183	+ 3,903
Wigan Corporation	,, 1	1,534	1.570	+ 36	39½	59,347	+ 5,821
Wolverhampton Corp	,, 7	1,005	1.013	+ 8	41	44,266	+ 2,285
Yorkshire (W. Riding)	,, 4	1,448	1.324	— 124	1	1,324	— 124

* From such of the services as were working both last year and this year the receipts show a decrease of £599 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London	Jan. 3	£5,595	£5,239	— £356	1	£5 239	— £356
City and South London	,, 3	3,169	3,056	— 113	1	3,056	— 113
Liverpool Overhead	,, 4	1,690	1,713	+ 33	1	1,713	+ 33
London Electric	,, 3	14.810	15,185	+ 375	1	15.185	+ 375
Mersey	,, 3	2.328	2,286	— 42	1	2 286	— 42
Metropolitan	,, 4	16,813	18 418	+ 1 605	1	18,418	+ 1,605
Metropolitan District	,, 3	13,230	13.346	+ 116	1	13,346	+ 116

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TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, January 9.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	73 — 75
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	+ 1/16	4¾ — 5 xd
5	Do. 5½% Cum. 2nd Pref.	...	4 3/16 — 4 7/16 "
100	Do. 4% Deb. Stk. Red.	+ 1	89 — 91 "
100	Do. 4½% Deb. Stk. Red.	...	96 — 98 "
100	Do. 5% Deb. Stk. Red.	...	97½ — 99½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	+ ½	100 —103 xd
1	Bath Electric Tramways, Lim. Pref. Ord	...	3/8 — 1/2
1	Do. 5% Cum. Pref	...	31/32 — 1 3/32
100	Do. 4½% 1st. Mort. Deb. Stock, Red.	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Sk.	...	84 — 86 xd
10	Blackpool and Fleetwood Tramroad Co.	...	13½ — 14
	Bombay Elec. Supply and Trams. Co., Ord.	...	12 — 13
10	Do. do. 6% Cum. Pref.	+ ⅛	11 — 11⅜
100	Do. do. 4½% Db. Stk. Rd.	...	92 — 94 xd
$100	Brazilian Traction Light and Power Co. Lim.	...	82½ — 84½
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	+ ⅛	7 3/8 — 7 7/8
5	Do. do. 5% Cum. Pref	...	4 7/8 — 5 3/8
100	Do. do. 4½% 1st Deb Stock, Red.	...	96 — 99 xd
10	Bristol Tramways and Carriage Co.	...	5½ — 5¾
10	Do. do. 4% Cum. Pref.	...	6¼ — 6¾
100	Do. do. 4% Deb. Stock	...	100 —102
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	— 6	99 —103 xd
100	Do. Pref. Ord. Stock	— 2	100 —104
100	Do. 5% Cum. Perpetual Pref. Stock	— 2½	99 —103
100	Do. 4½% 1st Mort. Debs.	...	98 —101
40	Do. 4½% Vancouver Power Debs.	— ¼	96 —100
100	Do. 4% Perpetual Cons. Deb. Stk.	— 1	91 — 94
100	British Elec. Traction Co., Lim., 6% Cum. Pref.	+ 1	87 — 90
10	Do. 7% Non-Cum. Pref.	...	53 — 56
10	Do. 6% Pref. Ord. Non-Cum.	+ ⅛	13 — 14
100	Do. Deferred Ord. Stock	...	4½ — 6
100	Do. 5% Perpetual Debenture Stock	...	92 — 93
100	Do. 4½% Second Debenture Stock, Red	...	77 — 80
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	84 — 89
100	Buenos Ayres Lacrosse Trams. Co., Stg. 5% 1st Mrt. Deb.	+ ½	99½ —101½
5	Calcutta Tramways Co., Limited. Ord.	...	6 — 6¼
5	Do do. 5% Cum. Pref.	...	4 7/8 — 5 1/8 xd
100	Do. do. 4½% 1st Deb. Stock, Red.	+ 2	95 — 98 "
1	Cape Electric Tramways, Ld.,	...	31/32 — 1 1/32
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	3 — 3¼
100	Do. 5% Debs., Red.	...	88 — 91 xd
5	City of Buenos Ayres Trams. Co. (1904), Lim.	...	5¼ — 5½
100	Do. 4% Debenture Stock Red, 1985	...	91 — 96 xd
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.	...	88 — 92
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	...	93 — 95 xd
10	Cork Electric Tramways and Lighting Co. 6% Cum. Pref.	...	— 8½ "
10	Dublin United Trams. Co. (1896) Lim. Ord.	...	— 11
10	Do. do. 6% Pref.	...	— 12½
100	Do. do. "A" Pref.	...	— 78½
100	Do. do. Deb. Stock "B" Red.	...	— 77
10	Gateshead & Dist Trys. Co., Ord.	— ¼	8¾ — 9¾
10/-	Hastings & Dist. Electric Trams. Co., Ld., Ord.	...	3/32 — 5/32
1	Do. do. 6% Cum. Pref.	...	1/8 — 1/4
100	Do. do 4½% Deb. Stk. Red.	...	66 — 71
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	94½ — 98½
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)	...	84½ — 89½
10	Imperial Tramways, Ord.	...	3½ — 4¼
10	Do. do. 6% Cum. Pref.	— ½	6¼ — 6½ xd
100	Do. do. 4½% Deb. Stock	— 1	75 — 77 "
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.	+ ½	2 — 2½
100	Do. 4% Debenture Stock	...	71 — 76 xd
1	Kalgoorlie Elec. Trams., Ltd.	...	0 — 1/16
100	Do. do. 5% "A" Deb. Stk.	...	85 — 90
100	Do. do. 6% "B" do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.	...	¾ — 1
10	Lanarkshire Tramways Co.	...	9¼ — 10¼
100	Lancashire United Tramways. 5% Prior Lien Deb.	...	75 — 79 xd
1	Lisbon Electric Trams., Lim., Ord.	...	1⅛ — 1⅜
1	Do. 6% Cum. Pref.	...	1 1/16 — 1 3/16 xd
100	Do. 5% Mort. Debs.	+ 2	91 — 96 "
1	London and Suburban Trac. Co., Lim., Ord.	...	¼ — 5/16
100	London General Omnibus Company, Limited, 4½% Deb.	...	94 — 96 xd
100	Do. Do. 5% Cum. Inc. Deb. Stk. Red.	...	86 — 88
100	London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red	— 1	58 — 62 xd
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref.	...	4⅜ — 5¼
5	Do. do. 5% Deb. Stk., Red.	...	99 —101 xd
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	79 — 82 "
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	...	108 —111
$1,000	Do. do. 5% Bds.	...	98½ — 98½
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	⅞ — 1
100	Metropolitan Elec. Trms. Ltd. 4½% Deb. Stock, Red.	...	80 — 84 xd
100	Do. 5% Deb. Stock, Red.	...	86 — 89
100	Mexico Tramways Co., Common Stock	— 2	63 — 66
	Do. Gen. Con. 1st Mort. Gld. Bonds	— 3	74 — 79
100	Do. 6% 50-yr. Mort. Bonds	— 2	74 — 76 xd
...	Michigan United Railways 5% 1st Mort. Gld. Bonds	...	91 — 93
100	Montreal Street Railway, Sterling 4½% Debs. (1922)	...	99 —101
100	Do. 4½% Sterling Debs, (1922)	...	98 —100
1	National Steam Car Co. Ltd.	...	¾ — 1
10	Oldham—Ashton and Hyde Elec. Ord.	+ 1/16	5¾ — 6⅛
10	Do. do. 5% Cum. Pref.	...	5⅞ — 6⅛
5	Para Elec. Rlys. and Ltg. Co., Ord.	— ⅛	5 — 5¼
5	Do. do. 6% Cum. Pref.	— 3/16	4½ — 4⅝
1	Perth (W.A.) Elec. Trams., Ld., Ord.	...	1⅛ — 1⅜
1	Potteries Electric Traction Co., Ltd., Ord.	...	1/8 — 1/4
1	Do. 5% Cum. Pref.	...	15/16 — 1 1/16
100	Do. 4½% Debenture Stock, Red.	...	84 — 87
1	Provincial Tramways, Lim., Ord.	...	3/32 — 3/16
10	Do. 5% 1st Deb. Stock	...	95 — 98
...	Puebla Tramway, Light & Power Co., Prior Lien 5%	...	76 — 80 xd
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.	...	5 — 5¼ "
100	Do. do. 4½% 1st Mt. Db. Stk	...	94½ — 96¾ "
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	84 — 87
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	— ½	97 — 99 xd
100	Do. do. 5% 50-yr. Mort. Gold Bonds	— 1	89 — 91
100	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	...	97 —100
$50	Do. 5% 1st Mort. Debs., Red., 1929	...	100 —103
10	Shanghai Elec. Construction Co.	...	10 — 11
100	Singapore Elec. Tramways Lim., 5% Debs. Red	...	86 — 90
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref.	...	⅝ — ¾
100	Do. do. 4% Deb. Stk.	...	66 — 70 xd
..	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	+ 1	94 — 96
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	97 — 99
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	82 — 84 xd
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	92 — 95
5	United Elec. Tramways of Monte Video, Ord.	...	4⅜ — 4⅞
5	Do. do. 6% Cum. Pref.	...	4¾ — 5⅛
100	Do. do. 5% 1st Deb. Stk. Red.	...	93¼ — 96½
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	95 — 97
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	⅛ — ⅜
5	Do. do. 6% Cum. Pref.	...	3½ — 4 xd
100	Do. do. 4½% 1st Deb. Stock. Red.	...	79 — 84 "

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

FOUNDED 1892. LONDON, JANUARY 15, 1914. VOL. XXXV.

THE TRAMWAYS OF THE CITY OF MEXICO.

A COMPREHENSIVE SYSTEM OF ELECTRIC TRACTION FOR PASSENGERS AND GOODS.

Those concerned in tramway undertakings abroad in which British capital is invested have been a good deal perturbed since war and chaos descended on Mexico on the conclusion of the long and pacific domination of President Porfirio Diaz. Since that strong hand was withdrawn revolutions and fighting have plagued the country, and for more than two years settled pacific government has been absent. But in the City of Mexico itself everyday life appears to have been comparatively little disturbed, as is shown by the fact that the revenues of the Mexico Tramways Company still go on increasing. It is true that the increase for the year 1913 compared with 1912 does not promise to be quite so large as the advance of 1912 over 1911, but 1912 was a wonderful year for revenue despite the state of the country. In present circumstances it is of interest to review the position of the company, and the scope of its undertaking, which includes both passenger and goods services.

The Mexico Tramways Company was incorporated under the laws of the Dominion of Canada in 1906, with its head office in Toronto, Canada. It was formed with the object of acquiring and consolidating the tramway systems of the City of Mexico, and the surrounding district. With this view the company acquired all the shares and debentures of the Mexico Electric Tramways, Limited, and this company works the undertaking under concessions expiring in 1982. The original Mexican company working tramways in the city was bought up a number of years ago. The president of the Mexico Tramways Company is Dr. F. S. Pearson, of New York, and the other directors include gentlemen residing in Canada, Mexico, England, France, and Belgium. The registered offices are at

Plaza de La Constitucion, the Central Traffic Point in City of Mexico.

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34, Bishopsgate, London, E.C. Mr. Harro Harrsen has for several years been the general manager. In looking at the finances of the company, it has to be borne in mind that on the one hand the accounts are stated in Canadian currency, while the statistics of tramway operations are in Mexican currency, and on the other hand that about half the total capital liabilities of the company consists of shares and other securities held in subsidiary companies.

The total issued capital of the company, including bonds, amounted at December 31, 1913, to over 32 million dollars Canadian currency. The advances to and from subsidiary and other companies controlled amounted at the same date to over 16 million dollars. The principal associated company is the Mexican Light and Power Company, in which the tramway company holds a controlling interest, and which supplies from hydro-electric stations the energy for working the tramways. Out of the total revenue, something approaching one-half is obtained from interest and dividends on loans to and securities of other companies. The tramway company regularly pays good dividends. During the year 1912 it paid four quarterly dividends at the rate of 7 per cent. per annum on the share capital, and during 1913 these quarterly dividends were continued. In the directors' annual report for 1912, which was presented to the meeting of the company held in Toronto in June last, it was stated that, in order to ensure proper protection for the company's properties and the continuous operation of its service during the disturbance in Mexico, the management was obliged to incur a considerable amount of extraordinary expenditure, and as a result the directors were glad to report that the company was able to maintain its services in a very satisfactory manner, and did not sustain any serious damage to its property. During the year 1913 reports from Mexico showed that the earnings were unaffected by the continued state of war in the country; in fact considerable increases in gross revenue were recorded month by month. To take the month of November last, which is the latest return available at the time of writing, the gross traffic earnings amounted to 605,467 dollars Mexican currency, being an increase of 40,228 dollars over the corresponding month of 1912. The working expenses for the month were 281,542 dollars, an increase of 21,476 dollars, the net earnings amounting to 323,925 dollars, thus showing an increase of 18,752 dollars. Taking the aggregate for the 11 months from January 1 to the end of November, the gross traffic earnings were 6,337,805 dollars, an increase of 177,861 dollars. The operating expenses were 2,947,472 dollars, being an increase of only 37,571 dollars. The net earnings for the 11 months thus amounted to 3,390,333 dollars, an increase of 140,290 dollars. The Mexican dollar at par value is equal to 50 cents of American or Canadian currency, and thus may be taken roughly as equivalent to 2s. of our money. Mexican currency can thus be conveniently converted into pounds sterling by dividing by 10. In the table which follows are also to be found Mexican cents; each of these, of course, is equal to half a United States cent, and may be called ½d. in British money.

The following table shows comparative results of the working of the tramways for the years 1910, 1911, and 1912. Among the points to be noticed are the large revenue from the hire of funeral cars and the facts that first and second class passengers are carried in the passenger cars, that trail cars are largely employed, that a large goods business is done, and that the receipts and expenses per car-mile do not differ materially from those which rule in this country.

While the state of the country has not prevented the continuance of the increases of the tramway revenue, the company is affected by the fact that the exchange value of the Mexican dollar has been very much depreciated since the country entered into its present disturbed condition. The Mexican currency has, in fact, depreciated by about 25 per cent., which means that on exchanging for British money only about 1s. 6d. a Mexican dollar is at present being realised.

The schedule of gross earnings and operating expenses (in Mexican currency), and miscellaneous information for three years is as follows:

	1910	1911	1912
Car earnings:			
Passengers ..	$4,772,855·66	$4,977,052·78	$5,555,894·85
Tickets	504,550·00	550,812·65	618,071·25
Touring cars ..	7,407·22	477·00	..
Chartered cars ..	19,513·13	12,816·12	20,766·40
Freight	276,019·86	228,838·01	183,736·49
Baggage and parcels.. .	103,570·70	108,163·93	100,702·81
Funeral	150,822·01	148,752·55	160,312·21
Total ..	5,834,738·58	6,026,913·04	6,639,484·01
Miscellaneous income.. ..	47,795·25	150,057·84	183,191·74
Total ..	5,882,533·82	6,176,970·88	6,822,675·75
Operating expenses including taxes ..	2,885,924·46	3,000,352·33	3,206,901·00
Passengers carried for cash fares:			
1st class	55,771,796	57,994,240	65,897,541
2nd class .. .	20,561,721	22,597,671	24,514,378
Total .	76,333,517	80,591,911	90,411,919
Car mileage:			
Motors and trailers	11,093,178	11,582,549	12,702,281
Animal .. .	638,676	497,555	318,015
Freight and sundry	1,063,321	935,436	985,464
Total ..	12,795,175	13,015,540	14,005,760
*Average No. cars:			
Electric	234·40	217·99	224·02
Mule	18·60	12·35	9·10
Total ..	253·00	230·34	233·12
Average passenger receipts per car-mile .	44·98c.	42·47c.	48·61c.
†Operating expense	23·73c.	22·16c.	24·40c.
Daily average earnings from operation	15,985·59	16,887·05	18,614·88
Daily average operating expenses	7,626·55	7,901·08	8,468·37
Percentage of gross gross earnings &	expenditures, including taxes, to income 49·06	48·57	47·00

* Average number in operation 18 hours per day.

† Expenses per car-mile passenger and goods service. Taxes are not included.

The City of Mexico.

We may now turn from the finances of the company to glance at a few of the features of the city in which the company operates. The city of Mexico, with its long and interesting history since the time of the Spanish invaders, is now one of the finest and most impressive towns on the American Continent. It contains many imposing buildings of old Spanish architecture as well as modern fireproof structures. The buildings include a cathedral, the President's Palace, the Municipal Palace, and many fine churches, hundreds of beautiful residences, clubs, etc. The city is the metropolis and commercial centre of Mexico, and has a population of about 600,000, while the Federal District surrounding it has about 300,000 more, so that somewhere near a million of people are served by the tramway system. Though the city is situated within the tropics, it has, on account of its elevation of 7,500 feet above the sea level, a temperate climate, and the nights are very cool. The population includes a large percentage of foreigners, and many of the principal commercial and mining enterprises are conducted by citizens of the United States. The

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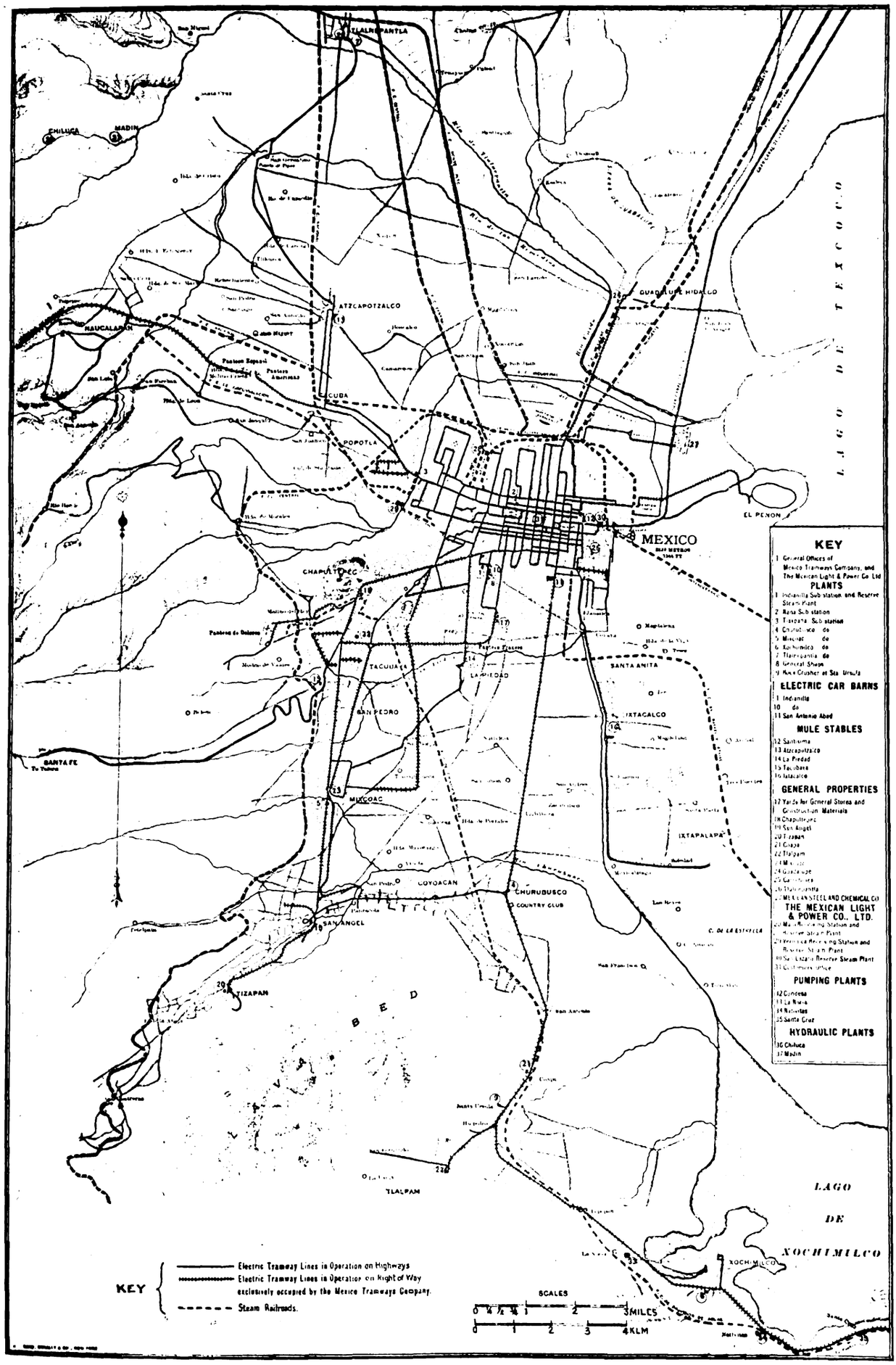

Tramways in the City of Mexico and Environs.

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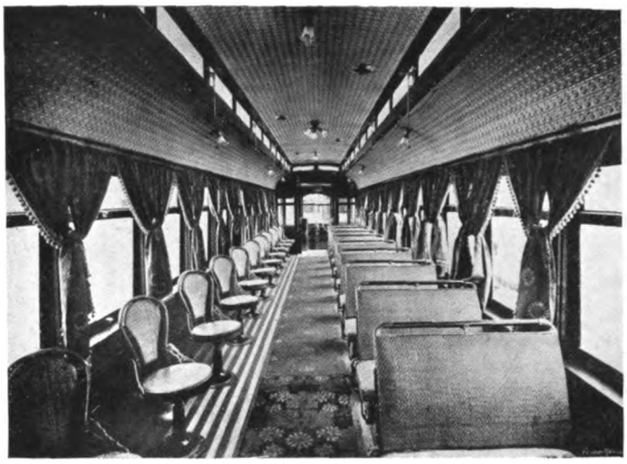
industries are represented by cotton mills, tobacco factories, machine shops, foundries, etc. Among the lower classes are a large proportion of American Indians, who cling to their ancient customs and inhabit crude dwellings. Before the stable Government came to an end steps were being taken to alleviate the condition of the lower class, and to teach them to live in a healthful way. Their convenience, as well as that of all the other inhabitants of the city is served in a special way by the undertaking of the Mexico Tramways Company, which has been the chief factor in the expansion and improvement of the city and its suburbs, and is very closely related to the life of the citizens. The cars are used by all classes for business and pleasure, and are also largely employed for the transportation of goods.



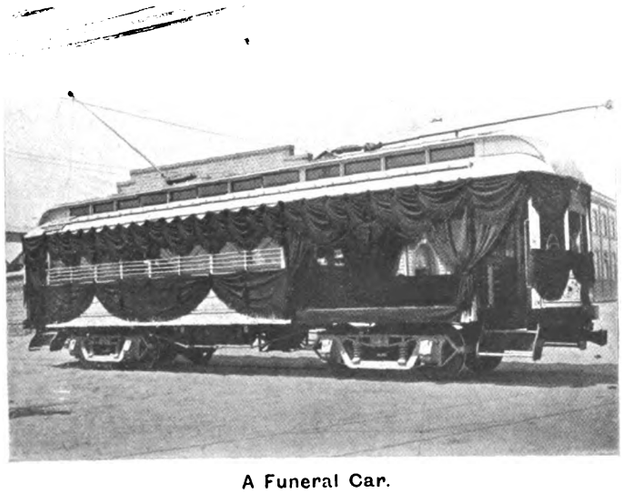
Interior of a First-Class Car.

The Tramway System.

The accompanying map shows how numerous are the tramway routes in the centre of the city, and also that they radiate out in certain directions for long distances. Extension work has been in progress for several years, and a considerable mileage of lines worked by mules has gradually been converted to electric traction, until at the end of 1912 only 15 track-miles were operated by mule-drawn cars. Among extensions which are in contemplation and have, in fact, been begun, are two long interurban lines, one to Puebla, a distance of about 100 miles to the south-east, and another to Toluca, about 45 miles to the south-west of Mexico City. The existing suburban lines already run on their own right-of-way, while those in the centre of the city are laid on the streets. The Puebla and Toluca extensions will, of course, be on their own right-of-way, and will form genuine interurban railways. During the year 1912 the first sections of these two lines were placed in operation, the Toluca section for a distance of 5½ miles from Sante Fe, and the Puebla section as far as Tulyehualco, a distance of 6·9 miles from Xochimilco. As projected, the Puebla line will climb the west slope of the extinct volcano Popocatepetl, reaching an elevation of 13,600 ft., at which point the railway will be nearly up to the snow line and within about 2,000 ft. of the summit of the mountain. Should the scheme be carried out the line will form a scenic railway of special importance. At the end of 1912 the total track-mileage of the Mexico system was 208, compared with 195 miles in 1911 and 179 miles in 1910.

Stopping Place on One of the Suburban Lines.

The type of track construction in the city proper and on all paved streets involves the use of a solid bed of reinforced concrete under each track, steel channel ties being sunk in the concrete. The rails are 80 lb. and 114 lb. girder sections, with continuous joints and tie rods. On the suburban and interurban lines, which are on their own right-of-way, 70 lb. T rails are used. These are laid on creosoted sleepers, and a substantial ballast of crushed stone is employed. The power supply comes from the hydro-electric plant of the Mexican Light and Power Company. The water is obtained from sources among the hills 90 miles from Mexico City, and the plant includes the usual pipe line, water turbines, and electric alternators. The power company supplies energy not only to the tramways, but to the whole of the Federal district and to large mining camps. Transmission lines are carried on steel towers, and the pressure employed is 70,000 volts. The power is distributed from a main receiving station to seven sub-stations of the Mexico Tramways Company situated in different parts of the city and the Federal District. Two of the sub-stations receive alternating current at 3,000 volts, and the others at 20,000 volts, and distribute it to the tramways at 600 volts direct current. An interesting feature which has been in use is a sort of peripatetic sub-station, consisting of a steel car equipped with a motor generator set and a switchboard, capable of dealing with 500 KW. This sub-station is connected to the high-pressure lines of the power company at any point on the system where abnormal conditions require additional temporary power.



A Funeral Car.

At the end of the year 1912 the company owned 665 cars of various kinds, including first and second

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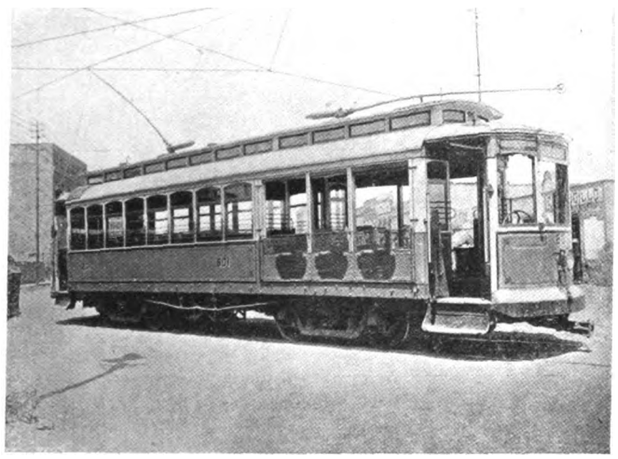
class motor and trailer cars, the trailers being very largely employed for second-class traffic, and a considerable number of motor and trailer cars for freight traffic. The funeral business, to which we have already alluded, requires no fewer than 58 cars. The cars and the equipment, as well as the service provided, will bear comparison with those in any part of the world. The service is divided into city and suburban, first and second-class, freight and funeral, each one requiring its own special equipment. The city service has first-class cars with a uniform fare of six cents, Mexican currency (equal to about 1½d.). Most of the cars are of the double-truck type. The suburban service is chiefly worked by trains of two cars each, the motor cars being first-class, and the trailer cars second-class. On some lines, however, there are separate first-class and second-class motor cars. For the suburban business a special express, or "rapido," service is established, consisting of express trains from the principal suburbs to the centre of the city. These trains are worked into the city in the early morning, returning to the suburbs at one o'clock, and again back to the city at 2-30, returning to the suburbs at seven in the evening. A route 11 miles long is covered by these fast cars in half an hour, only two or three stops being made by the way.

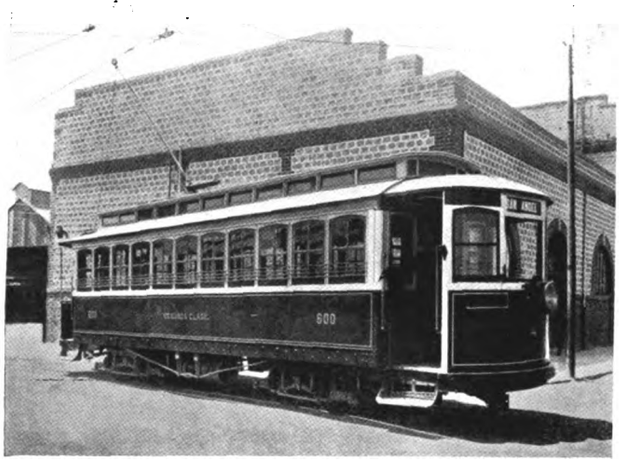
The freight service is supplied by trains of two cars each, the motor car being either a closed one or of the gondola type with a gondola trail car. These cars have a capacity of about 30 tons. The equipment in connection with funerals is of many types to suit various conditions. This part of the work grew up from the fact that the cemeteries are as a rule several miles outside of the city, and the roads leading to them in the past were very rough. The company has also for special occasions a number of fine private cars, which are chartered for private parties, and are used also by public officials and for the "seeing Mexico" service, which is much patronised by foreign travellers. The original electric cars of the company were to a large extent supplied by the J. G. Brill Company, whose trucks are, we believe, used exclusively on the tramway company's lines, but in subsequent years the latter has built in its own shops the additional cars.

The shops are situated near the head office of the company, in the part of the city called Indianilla, and here also are to be found the principal car sheds, a steam power-station, which is used as an auxiliary, and various shops and offices. The machine shop is manned by Mexicans, who prove satisfactory workmen. Drivers and conductors are also native Mexicans, who perform their duties well. In other parts of the city there are two large car sheds and a freight yard, besides general stores.

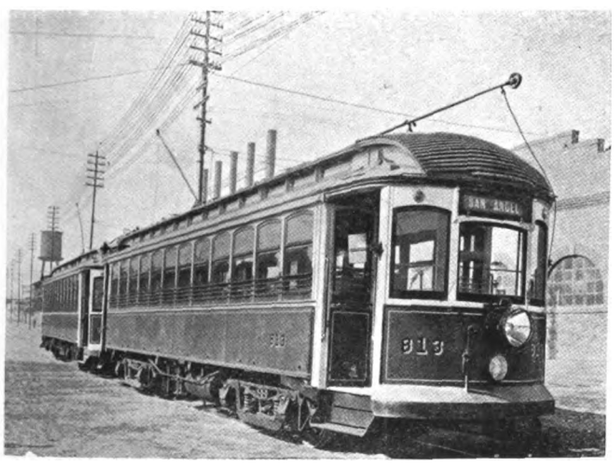
Most of the car routes pass the Plaza de La Constitucion, or Plaza Mayor as it is generally called, which is the central traffic point. At this Plaza it is possible to take cars going direct to almost any point on the system. Another feature is the use of two adjoining parallel streets, with a single track on each street.



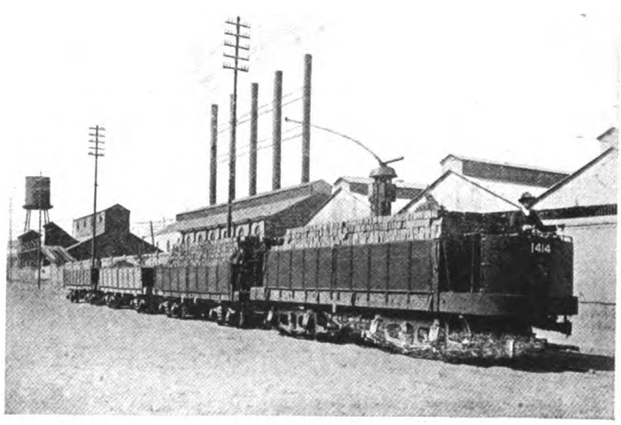
Combination First-Class Car with Vestibule Ends.



Second-Class Car with Vestibule Ends.



Standard Type of Train, including One First and One Second-Class Car.



Electric Goods Train—Power-Station in the Distance.

Rolling Stock of Mexican Tramways.

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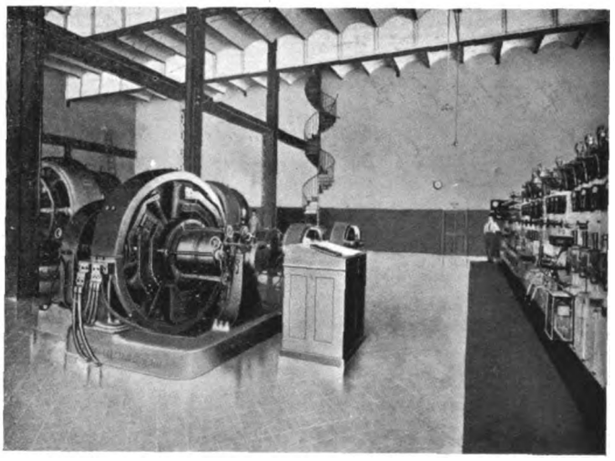
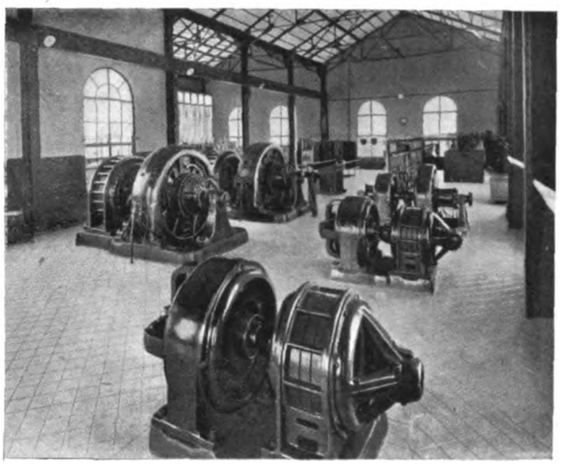
This is necessitated, as in the well-known case of Philadelphia, by the narrowness of the streets in the old part of the city. One of the principal features of the traffic consists of the enormous rushes which come on feast days, Sundays, and other holidays, when the people largely move to various points to attend religious festivals and bull fights. In fact, one of the bull rings has buildings which accommodate 30,000 people. The rushes of traffic are met by using very long open trail cars. A good business is also done on the suburban lines, which reach parks and lakes, beautiful suburbs, etc. In order to ensure that slow speed may be observed in the crowded narrow streets in the central part of the city, the cars are equipped with special controller handles, which prevent the turning of the controller beyond the point at which the motors operate in series. On leaving the low-speed zone, the handles are exchanged for the regular type of handles. A large amount of light goods, such as packages, farm produce, fruit, and flowers, is carried on the second-class cars, which are provided with large side doors. These goods have, however, to be in charge of passengers, and rates are imposed for the carriage of the goods.

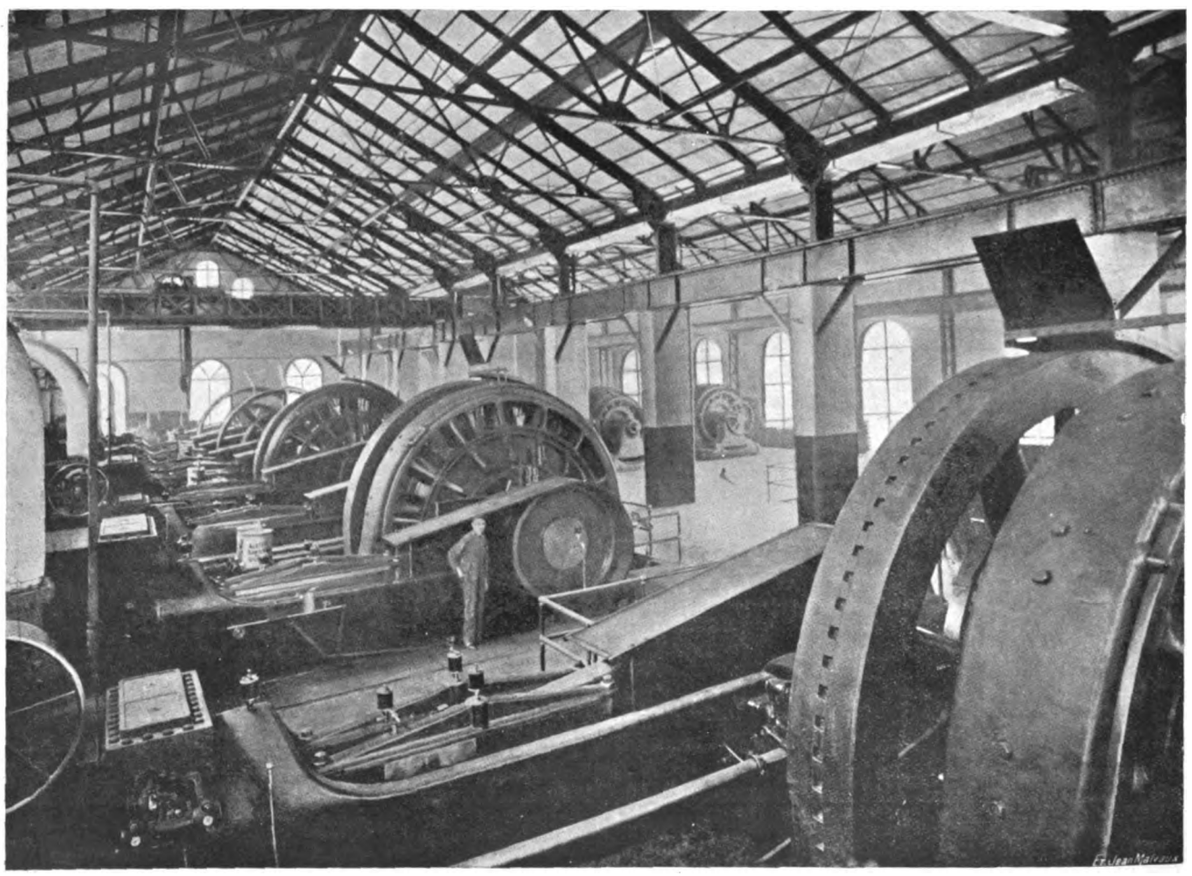


Interior of a Sub-Station.



Interior of One of the Transformer Stations.

It has been mentioned that the city fares are six cents, but outside the central area the fare increases in proportion to the distance, the basis of charge being three cents Mexican currency for each mile. The second-class fare is about 40 per cent. less than the first-class. It will thus be seen that the system is very complete and efficient.



Interior of Steam Power-Station of Mexico Tramways.

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PASSENGER TRAFFIC OF GREATER LONDON, 1912—1912-13.

By A. J. Lawson, M.Inst.C.E.

The following summary of passengers carried by railways, tramways, omnibuses, and cabs serving the metropolitan area in the past financial year completes, for the present, the history of London's passenger transport over a long period of years, the first part of which appeared in the issue of this journal for March 13 last. As before, the total of railway passengers is taken from the Board of Trade Return of Railways of the United Kingdom, issued in August, with the addition to ordinary ticket passengers of an allowance of 600 journeys for each annual ticket.

The number of tramway passengers has been obtained from the last published reports of the various companies, and from the figures kindly supplied to the writer by the local authorities concerned. The statistics relating to omnibus passengers are compiled from the accounts of the London General Omnibus Company and figures supplied by the Metropolitan Steam Omnibus, the National Steam Car Company, and the Central Omnibus Companies, while the number of passengers carried on the omnibuses owned by Messrs. Tilling and other proprietors has been estimated, exact data being unavailable.

The number of passengers by cabs is, for the same reason, an estimate based upon data furnished by a large number of cab drivers in various parts of the metropolis at different periods of the year, and is believed to be substantially correct. It is regrettable that drivers generally complain of less favourable results in the present year, which is ascribed to the fact of too many cabs being in service, and, incidentally, to omnibus competition and to the increasing number of privately-owned motor cars.

It will be observed that the total *additional* number of passengers in 1912, compared with the previous year, was nearly 104 millions, giving an average daily increase of over 280,000, instead of the 250,000 daily increase assumed in the report of Sir George Toulmin's Committee on London Traffic, and that the whole of this increase, and 29 millions more taken from the tramways and suburban traffic of main line railways and cabs, was absorbed by the motor omnibuses, the passenger traffic of the tubes and other local railways remaining practically stationary.

Local Railways.

	Total Passengers.	Increase + or Decrease —
North London	35,171,416	— 2,211,886
North and South West Junction	426,798	— 25,674
Metropolitan	103,116,238	— 1,442,798
Metropolitan District	87,304,411	+ 6,348,217
Metropolitan and District Joint Lines	526,075	— 55,851
East London	4,507,859	— 443,149
City and South London	24,458,106	— 1,632,979
Waterloo and City	4,786,893	— 123,877
Central London	36,078,027	— 2,099,371
Great Northern and City	12,718,957	+ 352,311
Whitechapel and Bow	26,438,031	+ 2,107,045
London Electric Railways— Gt. Northern, Piccadilly & Brompton; Baker Street and Waterloo; Charing Cross and Hampstead*	100,959,737	— 168,225
Total	436,492,548	+ 3,763

* Carrying respectively about 40, 30, and 30 millions.

Main Line Railways.

	Total Passengers.	Increase + or Decrease —	London Passengers as per cent. of Total.
Great Northern	63,177,249	— 3,656,767	50
Great Eastern	136,301,250	+ 2,502,407	80
London, Tilbury, & Southend	43,021,391	+ 1,620,353	80
South Eastern and Chatham	77,975,888	— 5,655,133	75
London, Brighton & South Coast	78,168,818	+ 280,385	75
London and South Western	80,189,842	— 2,442,775	33·3
Great Western	126,387,487	— 4,036,934	10
Great Central	41,584,618	— 2,100,042	8
London and North Western	109,451,911	— 3,888,750	10
Midland	79,245,814	— 2,047,403	10
Total	835,504,268	— 19,484,659	42·45

The total London traffic of main line railways is thus 353,720,501 (a decrease of 6,171,475), of which 5-7ths came from within a radius of 30 miles, and the other 2-7ths from beyond.

Percentage of Journeys of Season Ticket Holders to Total Passenger Journeys on Railways.

	1911	1912
Great Northern Railway	46	47·5
Great Central	43	42
Midland	37·9	38
North London	36·4	37
London and North Western	34·3	35·6
South Eastern and Chatham	28·4	29·6
London, Brighton, and South Coast	27	28·2
Great Eastern	26·5	26·4
Waterloo and City	24·8	25·8
Metropolitan	23	23·4
Great Western	21·5	22
Great Northern and City	21·1	22·5
London and South Western	17·6	18
London, Tilbury, and Southend	17	17·4
District	13·4	14·7
Whitechapel and Bow	12·5	14·7
City and South London	7·1	7·4
East London	6·5	6·3
North and South West Junction	5·6	5
Metropolitan and District Joint Lines	3·9	4·1
Central London	3	5·5
*Great Northern, Piccadilly, and Brompton	1·1	3·2
*Baker Street—Waterloo	1	
*Charing Cross, Euston, and Hampstead	0	

* Now London Electric Railways.

* Until two years ago season tickets were not issued by the London Electric Railways nor by the Central London Railway.

Tramways (2,859 electric, 60 horse cars).

	Total Passengers.	Increase + or Decrease —
London County Council	512,652,653	— 20,787,582
Walthamstow U.D. Council	11,857,549	
Leyton U.D. Council	17,476,453	
West Ham Corporation	40,200,347	— 1,717,811*
East Ham Corporation	17,775,698	
Ilford U.D. Council	7,578,813	
Barking U.D. Council	2,176,237	
Dartford U.D. Council	1,729,649	— 44,811
Erith U.D. Council	2,072,091	+ 222,202
Bexley U.D. Council	2,090,533	— 30,656
Croydon Corporation	20,504,143	— 345,087
South Metropolitan Tramways Co.	7,385,589	— 92,979
London United Electric Trys. Co.	61,139,285	— 1,407,843
Metropolitan Electric Tramways Co.	91,508,693	+ 1,600,016
Total	796,997,724	— 22,613,551

* In the case of the East End authorities it has been decided by the Board of Trade, that in the present instance, and on future occasions, the number of passengers carried on the tramcars owned by the respective authorities shall be stated, and not the number of passengers on the tramways in each district as hitherto; therefore the decrease on the whole six systems is here given, as a comparison with last year's figures in each case would be misleading on account of inter-running arrangements.

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OMNIBUSES (2,908 motor, 376 horse).

	Total Passengers.	Increase + or Decrease −
London General Omnibus Company	487,221,629	
National Steam Car Company ..	16,328,579	(Detailed particulars for 1911 not available.)
Metropolitan Steam Omnibus Co. ..	7,124,267	
Central Omnibus Company	10,367,557	
T. Tilling, Ltd., and other omnibus proprietors (estimated)	12,500,000	
Total	533,542,032	+ 132,913,545

CABS (7,969 motor, 1,818 four-wheeled, and 376 two-wheeled horse cabs—10,354).

	Total Passengers.	Increase + or Decrease −
	65,023,120	− 371,360

LICENSED VEHICLES.

Description.	Tramcars.	Omnibuses.	Cabs.	
	September 30th, 1912.			
Mechanical power	2,736	2,529		7,859
Animal power ..	59	498	4 wheeled	1,947
			2 wheeled	642
				10,448
	December 31st, 1912.			
Mechanical power	2,859	2,908		7,969
Animal power ..	60	376	4 wheeled	1,818
			2 wheeled	567
				10,354
	March 31st, 1913.			
Mechanical power	2,831	3,137		6,703
Animal power ..	55	313	4 wheeled	1,843
			2 wheeled	561
				9,107
	June 30th, 1913.			
Mechanical power	2,779	3,411		8,174
Animal power ..	40	242	4 wheeled	1,726
			2 wheeled	454
				10,354

SUMMARY.

	Total Passengers.	Increase + or Decrease −
Local railways	436,492,548	+ 3,763
Main line railways (London traffic)..	353,720,501	− 6,171,475
Tramways	796,997,724	− 22,613,551
Omnibuses	533,542,032	+ 132,913,545
Cabs	65,023,120	− 371,360
Grand total	2,185,775,925	+ 103,760,922

Estimated population, 7,340,079.

Diagram No. 1 shows the total traffics of the various systems of transport in the metropolis, and the total London traffic of the main lines of railway having London termini; but it may be of interest to give in tabular form the percentages of the total carried by each system in the years 1901, 1906, and 1912:

	1901	1906	1912
Local railways	20%	20%	20%
Main line railways	26·7%	23·7%	16·1%
Tramways	26·3%	31·8%	36·5%
Omnibuses	20·8%	19·4%	24·4%
Cabs	6·2%	5·1%	3·0%

The maintenance of a constant percentage by the local railways is noteworthy, especially in view of the changes which have taken place in the other systems and on the various local railways themselves, as, for instance, the North London Railway, the only one of the purely local lines of any importance which is still worked by steam (the other being the North and South West Junction Railway), which has lost nearly 15½ million passengers off its maximum yearly total in 1902, in its aggregate of 35,171,416 for 1912, or *actually about 8 millions less than the number carried in 1891.* The gains of other local lines and the new traffic of the tubes have, however, more than balanced this loss, and maintained the proportion of traffic of these lines to all other systems as shown above, notwithstanding the stagnation on the London Electric Railways and the retrogression of the Central London and City and South London lines.

Diagram No. 2 shows the fluctuations of London traffic on the main line railways with London termini for the 12 years since 1901, the variations in numbers on the South Eastern and Chatham and Great Eastern Railways being particularly noticeable; especially in the case of the first-named lines, to which a great accession of traffic accrued during the period of reconstruction of the South London tramways, when the breaking up of the roads made the running of even the old horse omnibuses very difficult, and travelling by railway was the only certain method of arriving at business with reasonable punctuality.

So soon, however, as the tramways were completed,

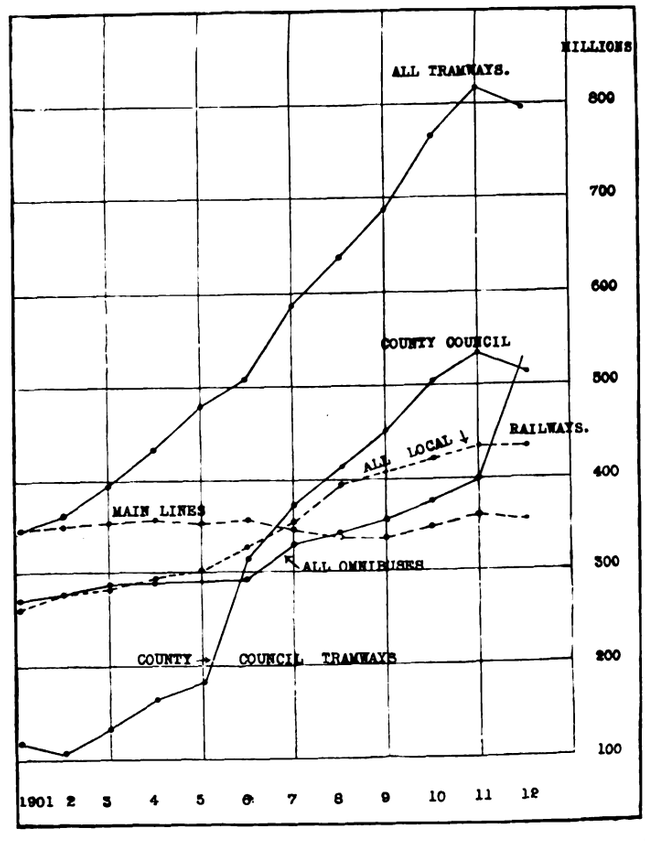

Fig. 1.—Passenger Traffic in Greater London - Main Lines, Local Railways, Tramways, and Omnibuses, 1901-1912.

and their electrical working had commenced, the railways immediately begun to loose traffic, which has steadily declined on the South Eastern and Chatham from the maximum in 1903 until in 1912 the decrease had actually exceeded 21 million passengers.

LONDON, BRIGHTON, AND S.C. RAILWAY.

On the London and Brighton Railway, also in 1901-2-3, an increase of passengers took place from the same cause and for similar reasons as on the South Eastern. A decrease commenced in 1904 and continued steadily until 1909, causing a maximum fall of over 8 million passengers in the yearly total; but since the electrification of suburban sections of this railway not only has this loss been retrieved, but 2½ million more passengers have been added, making the net increase due to the more frequent electrical trains and

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the introduction of clean, well-lighted, and more comfortable carriages over 10½ millions—a considerable proportion being taken over from the South Western Railway at Clapham Junction, where a new and convenient station with easy access thereto has replaced the wretched old structure which from the beginning of railway travelling did duty as an exchange station from the trains of one railway to another, which by no chance ever made approximate connection.

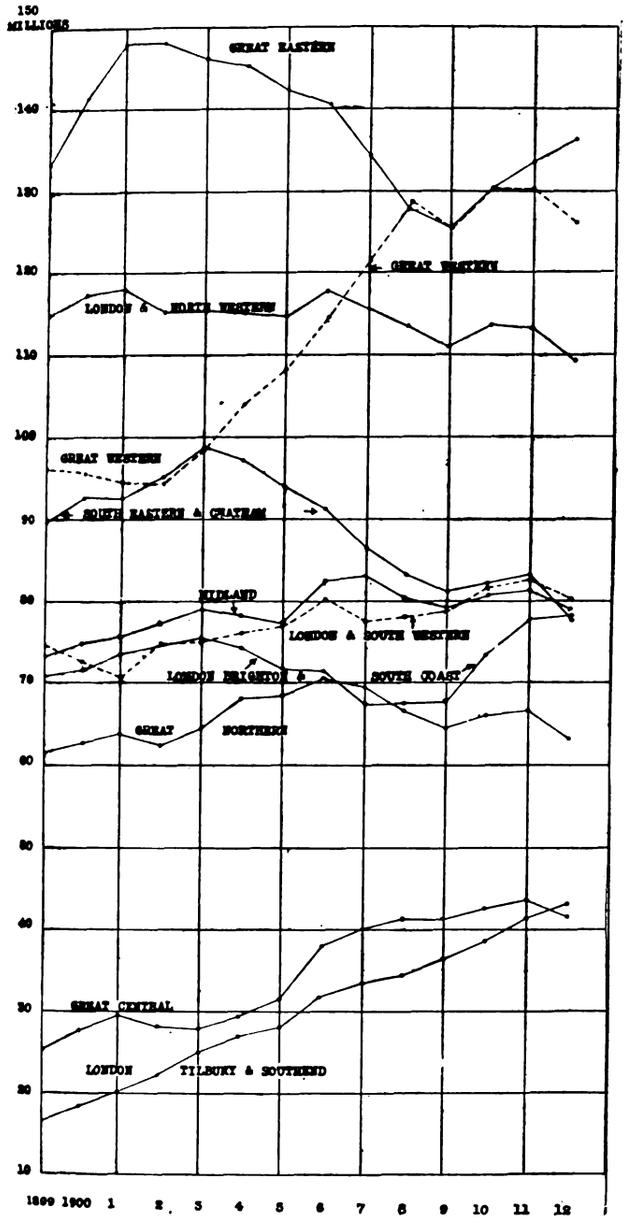

Fig. 2.—Passenger Traffic of Main Line Railways with London Termini—1899-1912.

MAIN LINE RAILWAYS.

Year	Total Passengers.	London Passengers.
1899	752,693,571	324,113,288
1900	769,692,903	337,236,410
1901	780,967,814	344,782,458
1902	792,909,944	350,698,594
1903	806,644,949	354,208,202
1904	814,778,172	357,949,291
1905	813,917,399	353,315,976
1906	838,745,551	356,614,853
1907	829,907,815	346,052,939
1908	823,292,725	338,396,532
1909	811,906,997	334,951,116
1910	840,539,599	348,271,343
1911	854,986,527	359,891,976
1912	835,504,268	353,720,501

LONDON ELECTRIC RAILWAYS.

1906	10,596,598
1907	56,237,144
1908	85,785,218
1909	95,098,330
1910	96,710,419
1911	101,127,062
1912	100,959,737

The rebuilding of Victoria Station with its now spacious accommodation, in contradistinction to the old ill-lighted and evil-smelling buildings, has also largely contributed to the popularisation of the Brighton line, though the narrow site renders sufficient platform room impossible, which want would have been more felt but for the quicker dispatch of trains which electrical working has effected. The inconvenience will, however, have to be borne, since further space is not to be obtained, but it is to be hoped that a better system of train dispatching may soon be adopted, since long waits of electrical trains beyond the platforms are still of frequent occurrence; and the long walk of about a quarter of a mile beyond the gates is an annoyance and inconvenience in the morning to passengers on their way to business, and in the evening a sprint of this length to catch a departing train is too exhausting to those who do not now hold quarter-mile records, especially when the reward of fleetness is too often but standing room with six or more people in an already crowded compartment in a train already in motion by the time it is reached, while another, timed to leave much later, stands at the near end of the platform, without any sign to distinguish it from the earlier train. This is the only main line on the suburban portions of which electricity as a motive power is yet in use.

London and South Western Railway.

The electrification of some of the London and South Western sections in and nearest London is already in progress, but with the running rails for the return of current, and not with a fourth rail for this purpose as on the local railways, thus adding another to the various different systems in use on railways serving the London district, until there will soon be in working more electrical "systems" than there were gauges on the original English railways. Eventually, no doubt, some standard system will be adopted after inter-running shall, for a time, have been rendered impossible.

The North Western and the North London.

The London and North Western has also in hand the electrification of a separate but parallel line to its main as far as Watford, intended to be run over by trains to and from Broad Street Station on the to-be-electrified North London Railway, the working of which is now under the management of the North Western Company, but will have the direct competition of the Metropolitan Railway with the latter's more direct and convenient route into the City: so it is improbable that the North London Company's losses will ever be made up from this combination or the North Western's traffic be much increased by the adoption of electric traction, unless connection be made and through working be arranged with other London railways.

Great Eastern Railway.

On the Great Eastern Railway between the years 1891 and 1901 the passenger traffic had increased from 100 millions to 148 millions, at which it stood for two years in succession, but with the opening of the East Ham and other East London electric tramways a rapid reaction set in, the tramway traffic quickly increasing year by year until in 1911 no less than 98 million people were carried on the tramcars of the various East End authorities, whilst in 1908 the railway company's passengers numbered less than 126 millions, a reduction

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of over 22 millions from the highest total in 1902, the whole of this loss of short distance travel being due to tramway competition, but at such low fares as were barely sufficient to cover working costs and standing charges.

Since 1909, however, this railway, while still remaining a steam-worked line, has increased the number of its passengers by over 10½ millions, to 136,301,250 in 1912—an increase of 2½ million passengers over 1911—which clearly shows that improved express train services to greater distances, leaving the nearer traffic more to tramways and omnibuses, is bringing about a recovery which in a very few years will raise the passenger total to its former high level at more remunerative fares, and with less operating costs, owing to the longer runs and fewer stops of trains. The growth of population along this company's lines is particularly rapid, the very convenient central position of Liverpool Street Station—the best terminal site in London—and the cheaper rents and cost of living at the various healthy residential points along the railway outside a five-mile radius from the city attracting a great number of city workers of all classes. Electrification, therefore, of any part of the Great Eastern Railway system is not likely to become of pressing urgency, and if ever undertaken will probably be confined within narrow limits. It must not be forgotten that the Great Eastern Company possesses special locomotives for suburban service of a very powerful, quickly accelerating, and most economical type—and that the adoption of electricity as a motive power would only be useful chiefly for facility of dispatch of suburban trains from Liverpool Street Station.

Great Northern and Other Railways.

The Great Northern Railway in the years 1904-5-6 obtained an increase of traffic during the period of reconstruction of the tramways in north London, but since then has lost over 7½ million passengers to the tramways and tube railways and omnibuses which have invaded its territory and given more direct routes to the business and shopping centres. Here, again, it is improbable that any great recovery would result from the adoption of electricity as the motive power for its suburban trains. Nor is the suburban traffic of the Great Western, Great Central, or Midland Railways of such volume as to yet necessitate the consideration of incurring any change in their methods of traction.

London, Tilbury, and Southend Railway.

The London, Tilbury, and Southend Railway showed an improvement of 1,620,253 in 1912 over the total for 1911, which for this line is rather a poor record, seeing that since 1880, when it only carried 2,900,000 people, it has never had a set-back in numbers, and that increases in recent times of over two million passengers a year have been of common occurrence, until now its annual total has exceeded 43 millions, and its annual season tickets have risen from 564 to 12,451. With progressive results such as these under the present conditions, no wonder the adoption of any other system of traction hangs fire—but for the benefit of electrical manufacturers and contractors this railway is under Parliamentary sentence of electrification.

South Eastern and Chatham Railways.

There still remains for consideration the case of the South Eastern and Chatham Railways, whose enormous losses in passengers have already been mentioned. With a very extensive but by no means complete network through some of the very finest residential districts in Kent, these railways should have retained their traffic against all competition by the adoption of electrical working of their suburban trains and a frequent service from stations within a 12-mile radius of Charing Cross, forestalling the electric tramways and motor omnibuses which have so severely cut into their business. The success of the Brighton lines' electric working, under less favourable conditions as to traffic density along the electrified lines, shows what might have been the results of similar enterprise on the South Eastern and Chatham suburban lines—nor is the time too late for the latter railways, if a start be made by first galvanising the directorates into life from their present state of suspended animation, and then fusing the companies so that the electrification of the two systems can be the more easily undertaken when the lines and stations both north and south of the Thames can be used in common, eliminating as far as possible the many cross-overs, especially from Cannon Street, which complicate and retard the working of trains under the most favourable conditions of weather and few trains, and which make successful operation in foggy weather and more frequent trains a sheer impossibility. Confining the Continental and long-distance trains to the Charing Cross and London Bridge stations of the South Eastern, and to Victoria station for the Chatham lines, would do much to lessen the difficulties of dealing with suburban and other short-distance traffic; but the cross-overs above referred to will have to be very radically changed before safety of working or improvement in service can be secured.

At present the electrification of the whole of the lines is under consideration, but the financial position of the companies is such that they had much better first confine the change to the suburban sections only, on which a good return could be immediately obtained, instead of aiming at being among the first to electrify the whole of a system from which sufficient returns are entirely problematical. There remains even for this, the important factor how to raise the necessary capital—which with these railways is perhaps the most difficult question to solve.

Tramways.

The next important step in connection with London traffic is the completion of the tramway system. If this latter had been in the hands of a private company, which had anything like the power and influence possessed, or which should be possessed, by the London County Council, it is safe to say that a great deal more enterprise would have been put into the undertaking than has yet been noticeable, more especially in the elimination of dead ends at the City boundaries and other inner points by the adoption of return loops, and the linking up of various lines to give through connection from the outer districts, for which purposes the construction of a little over six route-miles only would give an addition of about 25 per cent. in traffic, with a corresponding increase in gross earnings, and in greater measure in net revenue.

Results in 1913.

Assuming the same average fares as in the previous year, there has been a falling off in the numbers of passengers carried of over two millions on the City and South London, and about 100,000 on the North London Railway. On the other hand the London Electric Railways have carried about 200,000 more, largely due to the extension of the Bakerloo line to Paddington; the Central London three-quarters of a million more; and there have been substantial increases on the Metropolitan, and especially on the District Railway—but the total increase on balance is small.

The receipts of the L.G.O.C. indicate an increase of 100 millions in the number of omnibus passengers in Greater London, while there has also been a remarkable recovery in tramway passenger numbers. Of the local authorities hitherto showing losses, only three are below their figures for 1912.

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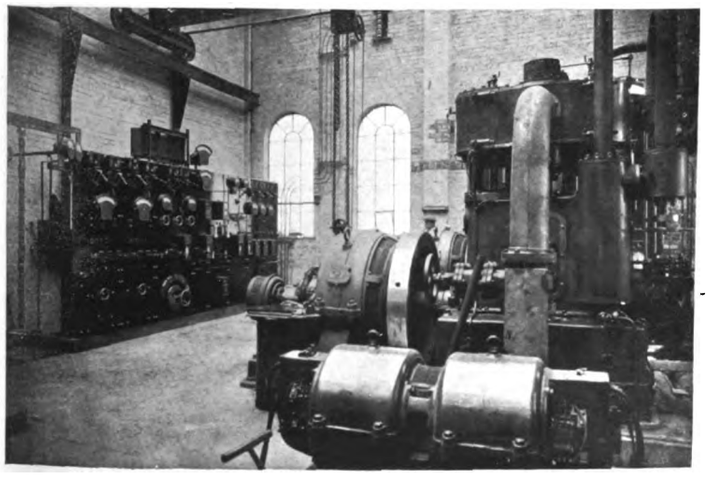
TRAMWAYS AND RAILLESS TRACTION AT ABERDARE.

On the occasion of the inauguration of the tramway and railless traction system belonging to, and entirely within the area of, the Aberdare Urban District Council, we gave a short description in our issue of November 13, 1913, of the first installation of the combined systems. As stated there the tramway consists of a single line with passing places extending from the cemetery, a point north-west of Trecynon, running south-east through Aberdare, a distance of nearly three miles, to the southern end of Aberaman. The trackless trolley routes branch out from the northern point to Cwmdare, about half a mile off in a south-westerly direction; from Aberdare, north-eastwards for nearly a mile to Abernant; and in two directions from Aberaman: the one, a continuation of the tramway south-eastwards for nearly a mile to Capcoch, the other in a south-westerly direction for a mile and a quarter to Cwmaman. It is hoped that the scheme will soon be extended some four miles to Mountain Ash.

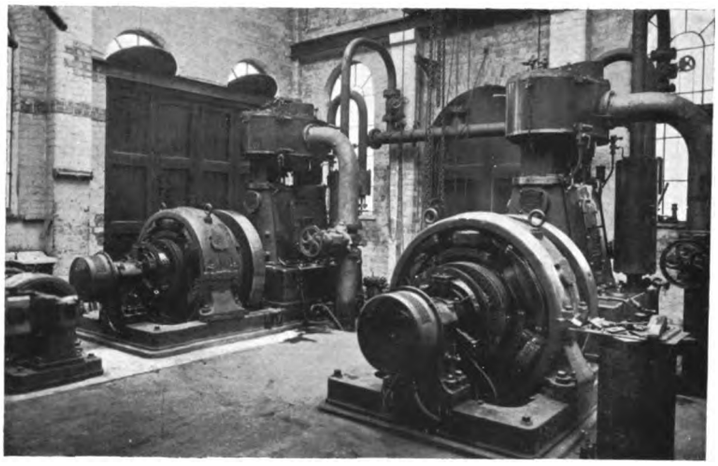
The Glamorganshire valley which the system serves has been called a "hive of industry," containing as it does many coal mines and iron works and a population in Aberdare alone of 50,000. There is no doubt that in the course of a comparatively short time the trackless trolley lines will have to be converted into tramways, and that the former will be re-erected further afield, thus forming one of those systems of light lines of which our Continental neighbours have reaped the benefit for so many years past, and of which we have been lamentably in want.

Thanks to Mr. Stephen Sellon, the engineer of the undertaking, we are now able to supplement our former description by fuller details. Mr. Sellon and his partners, as consulting engineers, helped to steer the project through Parliament, which finally authorised it under the Aberdare Urban District Act, 1911. The Board of Trade inspection was held on October 3 last; the tramways were opened six days afterwards. The railless routes will shortly be ready for full service. The general contractors were Messrs. William Griffiths and Company, London, who employed sub-contractors as hereinafter stated.



Switchboard and Generator.

The Council's generating station is situated at Gadlys: it was erected in 1910, and the supply of current commenced in April of the following year. The plant installed consisted of one 200-KW. and one 100-KW. compound-wound dynamo from the Lancashire Dynamo and Motor Company, coupled direct to high-speed engines by Messrs. Belliss and Morcom; a pair of 25-KW., 100-ampere, 250-volt balancing dynamos; one booster, a pair of 100-ampere, 100-volt dynamos, each direct coupled to a 30-B.H.P. motor. A Tudor battery of 256 cells was provided, whose normal rate of discharge is



Power-Station.

54 amperes for 10 hours, the maximum rate of discharge being 144 amperes. The switchboard contains generator, battery, balancer, booster, and lighting feeder panels. Steam is supplied from two boilers by Messrs. Babcock and Wilcox, having 3,600 square feet of heating surface each. They are fired from the Council's Horsfall refuse destructor.

To meet the increased demand for lighting and traction load additional plant had to be installed. This consists of two 200-KW. generating sets, similar to the one originally installed, fitted with slip-ring connections for static balancers (these rings have also been fitted to the original 200-KW. machine), and an automatic reversible booster. The additional switchboard contains generator, reversible booster, measuring station, Board of Trade, and traction feeder panels.

An extension of the boiler house has also been necessitated, which will have a fire-brick lined chimney shaft 137½ ft. high. The extension is being carried out by Mr. Henry Smith, contractor, Wolverley and Kidderminster, and contains an additional Babcock and Wilcox boiler with flues.

The car shed is close to the generating station at Gadlys, and was built by Messrs. John Morgan and Sons, Cardiff. The walls are of brick and rubble stone, except the front, which is of dressed stone. The roof consists of boarding and slating, carried on steel trusses. There are two bays with four tracks and car pits for two and portion of a third. The shed will hold 12 tram and eight railless cars. In the repair shop the track is provided with a car pit. There is also a paint shop. An adjacent building has been adapted as an office for the tramway and electricity departments.

The route length of the tramways is 2·94 miles, and the gauge 3 ft. 6 in. The whole of the track is paved with 4-in. Enderby and Norwegian granite cubes, with a string course of 5 by 3 in. setts on the outside

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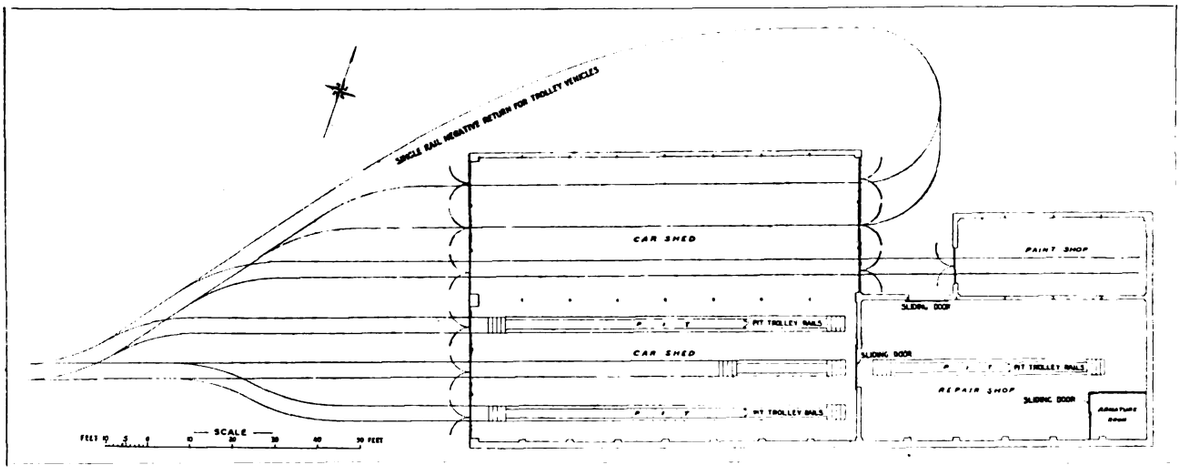
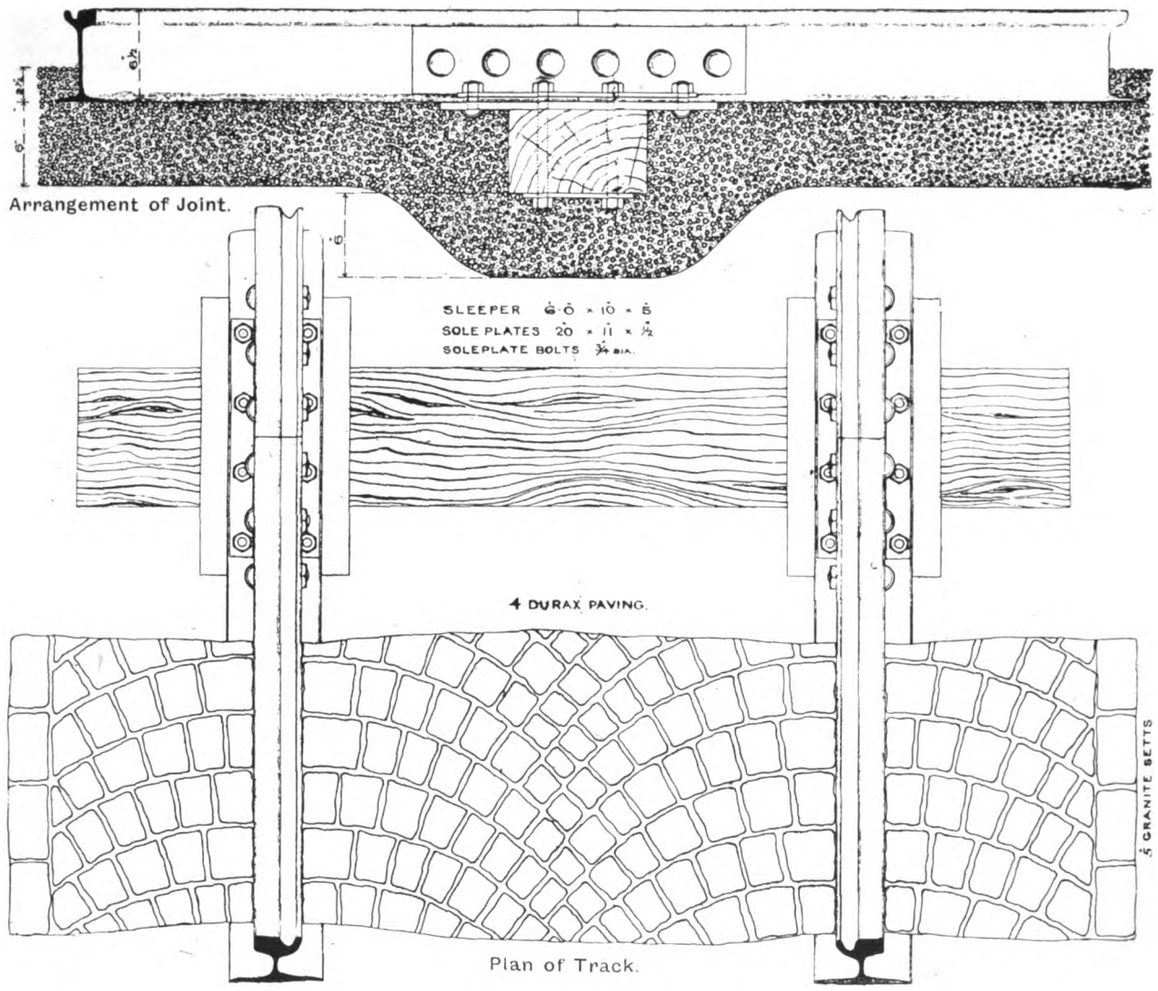
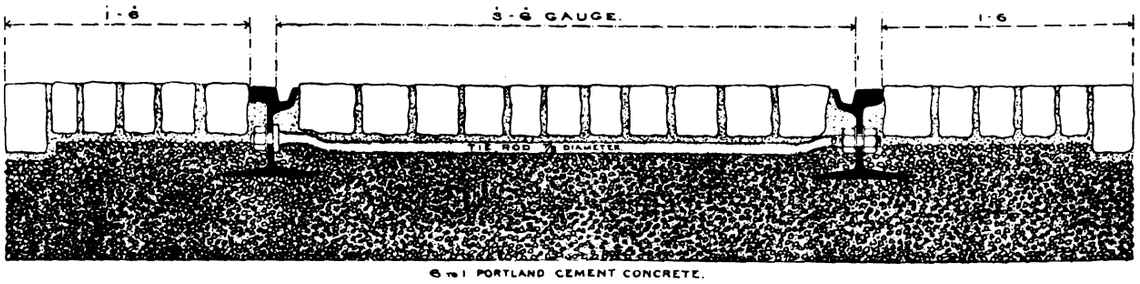


Plan of Car Shed.



Arrangement of Joint.

Plan of Track.



Plan and Section of Track.

TYPE OF PERMANENT WAY—ABERDARE TRAMWAYS.

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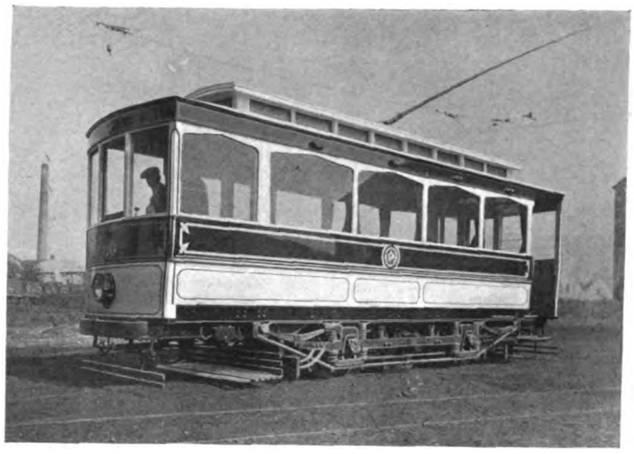
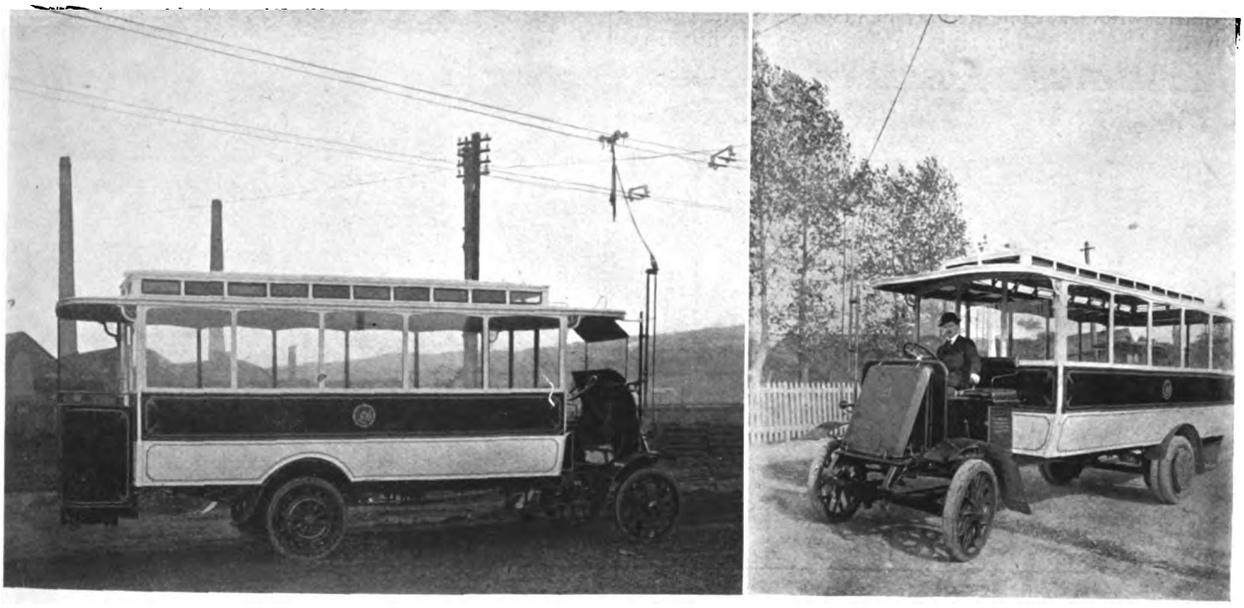
of the margins. This paving is laid on the "Durax" system of Kleinpflaster. On a 250-yard length in Gadlys Road the gradient varies from 1 in 13 to 1 in 20; there is no other gradient steeper than 1 in 20. The sharpest curves are of 50 ft. radius on the running track, and of 40 ft. in the depot approach road and yard.

Trackless Omnibus Reversing at Terminus.



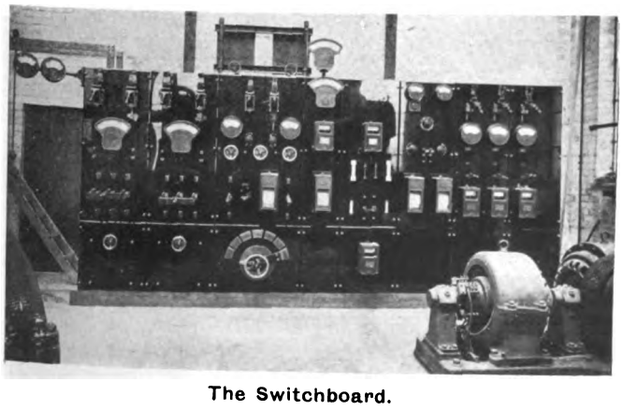
Vestibule Car—Aberdare Tramways.

The rails is under the Sandberg silicon rail steel specification, in 45-ft. lengths of No. 2 section and 35-ft. lengths for the heavier rails. The fish plates are standard, 24 in. long, and weigh 49½ lb. a pair. Half-inch sole plates are provided at each joint, where the rails are bolted through them to cross sleepers 10 in. by 5 in. There are no welded joints. The bonding is effected by two 12-in. protector-type 4/0 S.W.G. bonds at each joint; one of these is placed under each fish plate. The rails are cross bonded every 100 yards. The points and crossings are from Hadfield's Steel Foundry Company, and are of manganese steel; the overall length of the points is 13 ft., the tongues measuring 8 ft. 6 in.



Cedes-Stoll Trackless Omnibus.

The rails are the B.S. section No. 2 of 95 lb., except on curves of less than 150 radius, on which the B.S. section No. 2c of 101 lb. is laid. The material of the



The Switchboard.

The overhead equipment for both systems is provided with poles to the British standard specification. This work as well as the cables were carried out by Messrs. Clough, Smith, and Company as sub-contractors. The lines are divided into approximately half-mile sections. The trolley wires are of copper, of grooved circular section, equivalent to 3/0 S.W.G., and are supported by mechanical ears, with flexible bowstring suspension in the case of bracket-arm construction. Guard wiring is of No. 8 galvanised steel wire. The cables supplying the current from the Council's generating station at Gadlys are of uninsulated stranded copper of 0·2 square inch section, carried on poles, except for about

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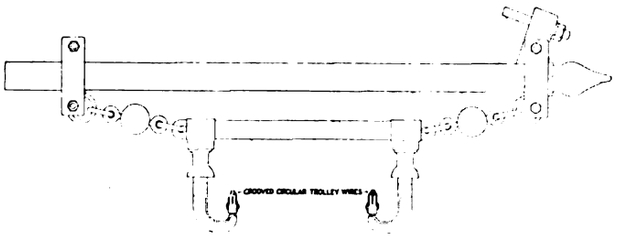
half a mile through the town of Aberdare, where paper-insulated, bitumen-sheathed cables have been laid solid in earthenware troughs.

On the tramway the overhead equipment is of span-wire construction, with the exception of a short length where bracket arms are used. The guard wires are earthed to the poles, every third one of which is bonded to the rails with a 1/0 S.W.G. copper wire.

The rolling stock consists of 10 single-deck tramcars with vestibule ends. Their length is 26 ft. 6 in. over all, and their four-wheel "Peckham" trucks, with



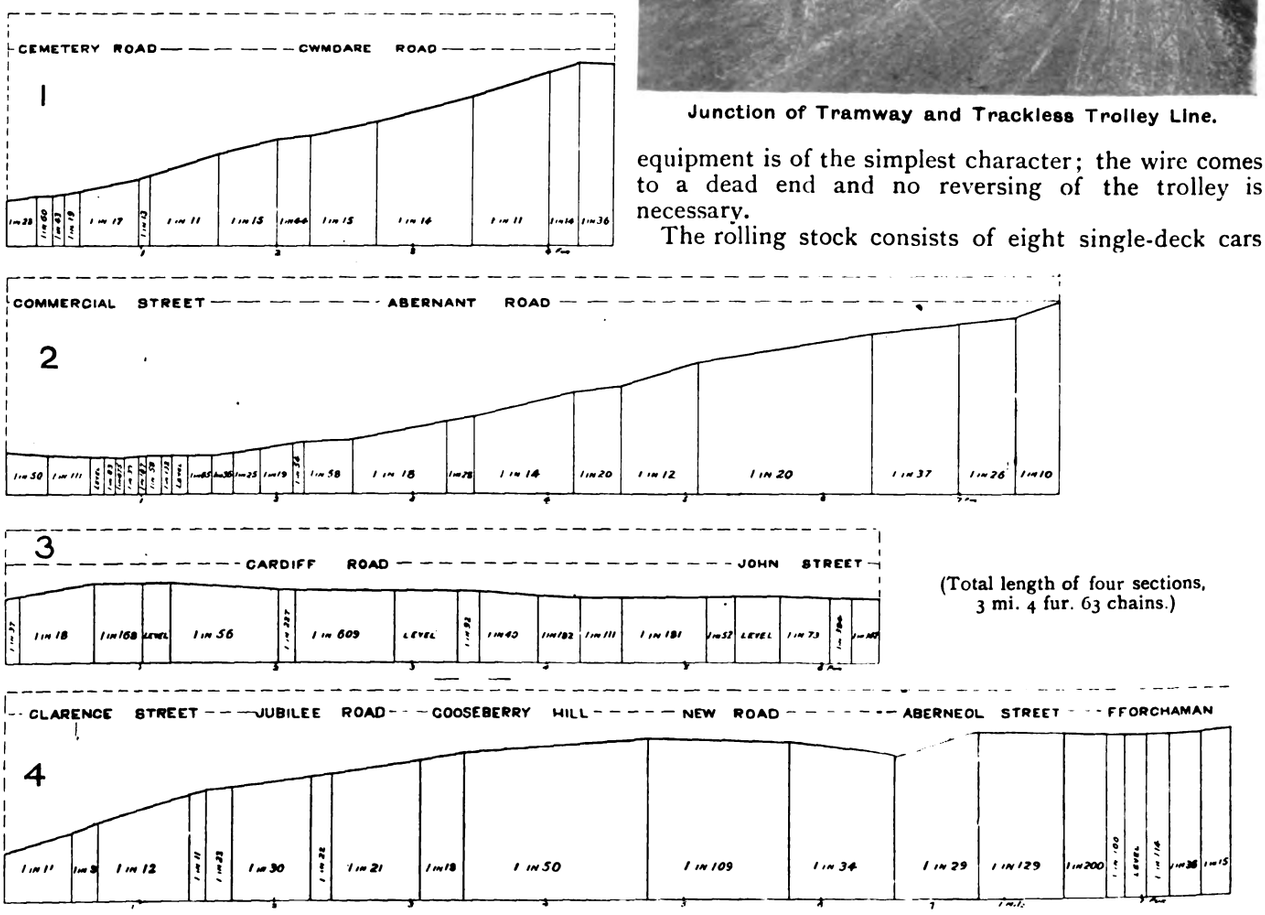
Suspension of Trackless Trolley Wires.

pendulum gear, have an 8-ft. wheel base. They seat 30 passengers. The Brush Electrical Engineering Company were the builders, and they are fitted with Hudson-Bowring life-guards, with Westinghouse "No. 200" motors and Dick-Kerr type D.B.1 controllers; and hand-wheel, "Peacock" track, and rheostatic brakes. The trolley heads are Holmes and Allen fixed type. The lighting is by 14 lamps in over-running current collector, with two wires (positive and negative) on the Cwmdare, Abernant, and Capcoch routes, and four wires on the Cwmaman route. The No. 8 galvanised steel guard wires are earthed to the negative trolley wires. At the termini the railless

Junction of Tramway and Trackless Trolley Line.

equipment is of the simplest character; the wire comes to a dead end and no reversing of the trolley is necessary.

The rolling stock consists of eight single-deck cars


CEMETERY ROAD — CWMDARE ROAD
1
COMMERCIAL STREET — ABERNANT ROAD
2
CARDIFF ROAD — JOHN STREET
3
CLARENCE STREET — JUBILEE ROAD — GOOSEBERRY HILL — NEW ROAD — ABERNEOL STREET — FFORCHAMAN
4

(Total length of four sections, 3 mi. 4 fur. 63 chains.)

Gradients of Trackless Trolley Lines at Aberdare.

three circuits of four each, the dash and canopy lights at each end being interchangeable.

On the railless system the overhead equipment is of bracket-arm construction, the length of the arms being from 7 to 11 ft. It is designed for the Cedes-Stoll with rear entrance and platform, 20 ft. 9 in. over all, and 7 ft. 3 in. wide, having a 12 ft. 8 in. wheel base, and seating capacity for 27 passengers. They are provided with two Cedes-Stoll hub-motors on the back wheels; Cedes-Stoll series-parallel controllers; a Cedes-Stoll

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over-running current collector with flexible cable connections, and with double-acting hand and rehostatic brakes. The car can deviate 40 ft. from the line of the trolley wires. The car bodies were built by Messrs. Christopher Dodson, Limited, Westminster, and the chassis and equipment by the Cedes Electric Traction Company.

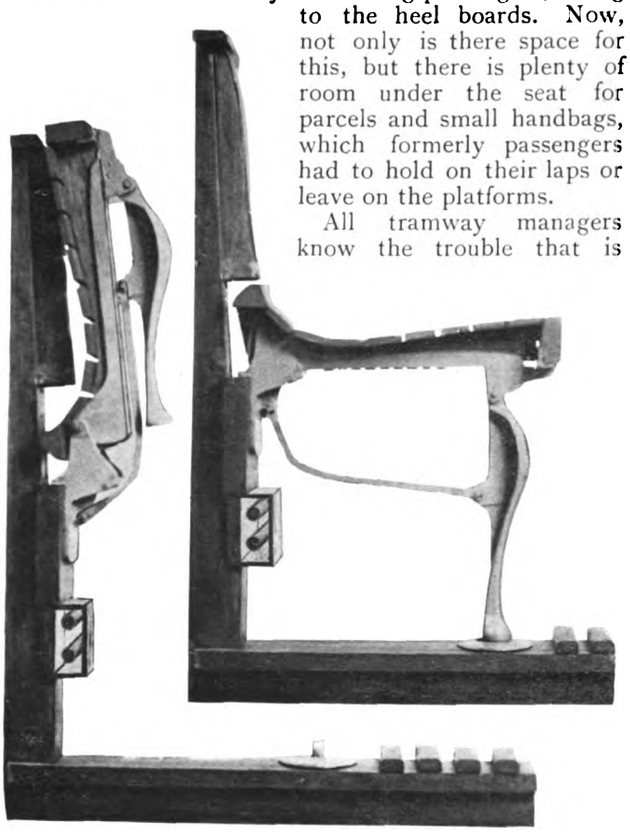
At the inauguration were Mr. T. W. Williams, chairman of the Aberdare Urban District Council, and vice-chairman of the Tramways Committee; Mr. E. M. Hann, chairman of the Tramways Committee; Mr. T. Ingliss Rudman, resident engineer; Mr. A. J. Abraham, general manager and electrical engineer; and Mr. Henry King, traffic engineer. The engineer, as previously mentioned, is still Mr. Stephen Sellon, M.Inst.C.E.

THE "KLEENCAR" SEAT.

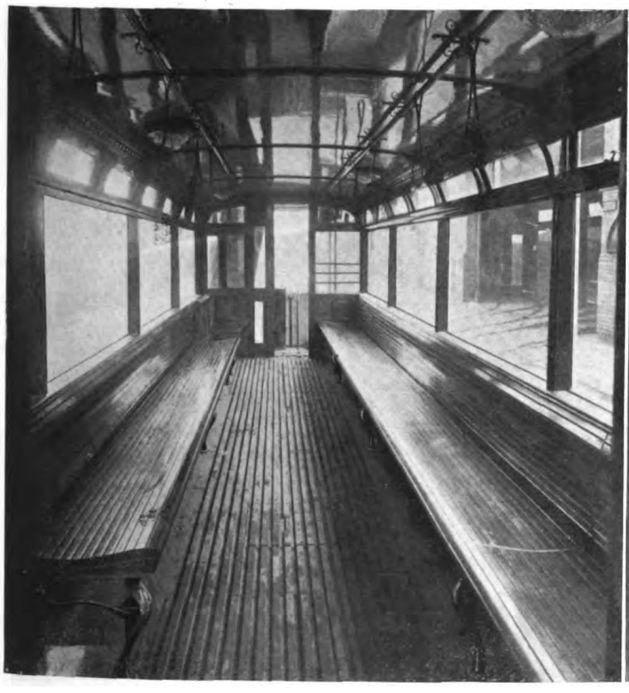
The illustrations on this page show a new method of fitting tramway car seats which has been adopted on some cars of the Doncaster Corporation. As will be readily understood from the photographs, the old boxed-in seat has been superseded by a seat supported upon legs and so arranged that it can be folded up against the seat back, leaving the floor from side to side perfectly unobstructed, so that the cleaners can easily and thoroughly do their work.

Mr. E. S. Rayner, the general manager of Doncaster tramways, states that the reason for the introduction of the new seat was that it was found that a considerable amount of dust and dirt collected under the ordinary seat, and lying as it did among the cables, resistances, etc., it was difficult, and costly, to keep the space under the seats properly clean. Now the cleaners quickly lift the seats and the car is perfectly cleaned every day. Although the slip-shod fashion in which the cables were carried underneath the seats provided an easy and convenient method, it was not the best way of dealing with cables carrying the amount of current and working at the pressure at which these cables work. Another advantage of the new seat is that it gives more space in the car for passengers' feet. With the usual seat there was no chance for passengers to put their feet out of the way of standing passengers, owing to the heel boards. Now, not only is there space for this, but there is plenty of room under the seat for parcels and small handbags, which formerly passengers had to hold on their laps or leave on the platforms.

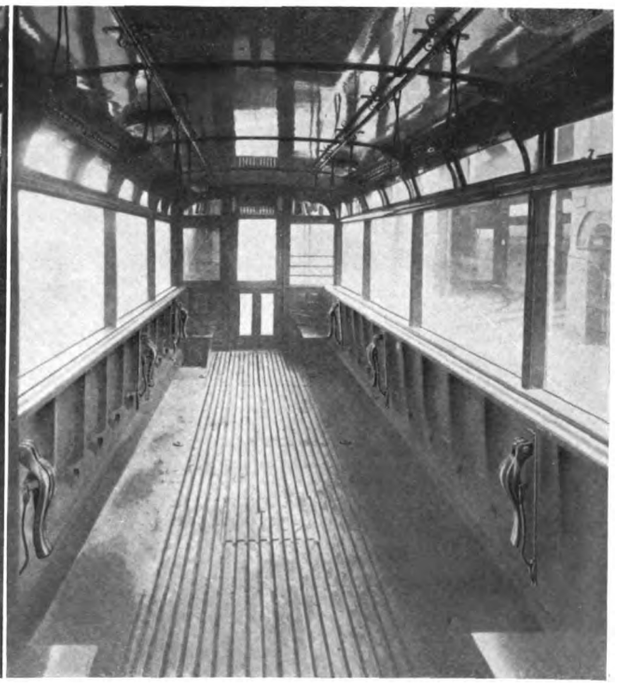
All tramway managers know the trouble that is experienced in preventing dust and damp getting to the joints and uprights and to the bottom frames. With the new seats these are properly boxed, and no doubt the life of the car is prolonged in this way. The seat, for which a patent has been applied, has been termed the "Kleencar" seat, and is being put on the market by the Peckham Truck Company, of Queen Anne's Chambers, Westminster, S.W.



The "Kleencar" Seat in Position and Folded Up.



The Seats in Position.



The Seats Folded Back Ready for the Cleaner.

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Railway Electrification.

In a brief review of the past year published in this issue, reference is made to the subject of the electrification of steam railways in this country. Though there is much activity in that direction in and near London, it cannot be said that the movement has been making much progress in other parts of the country. In the United States things are different. It is true that electrical enthusiasts over there are not quite satisfied with the progress which is being made, but at the same time, when circumstances warrant, and when the capital can be found, large electrification schemes are carried out. The same thing may be said to a certain extent of Canada. The latest information on the subject to come across the water is that orders have been given for the adoption of electric traction on the Rossland division of the Canadian Pacific Railway, and on part of the Canadian Northern Railway at Montreal. The latter doubtless refers to the tunnel, 3½ miles long, under Mount Royal, which is now approaching completion, and to lines connected with it. As to the United States, the news is that the Pennsylvania Railroad will adopt electric traction on its suburban division from Philadelphia to Paoli, and that the Chicago, Milwaukee, and St. Paul Railroad will electrify 440 miles of track. It is remarkable that, contrary to the view generally advanced as to the relative fields of direct-current and alternating-current traction, this Philadelphia suburban service is to be worked by the single-phase alternating-current method, while the main-line operation of the Chicago and St. Paul Company is to be carried out with 2,400-volt direct current. It is quite possible that if the railway companies operating in the north-eastern part of the United States are successful in their present application to the Inter-State Commerce Commission for leave to raise goods rates by 5 per cent., electrification both of suburban and main lines will go on much more rapidly than before. Owing to increased expenses the companies' net receipts are going down, although the gross receipts are going up, so that, as is the case in this country, capital cannot be got for developments. An increase in rates would palliate many difficulties. In this country capital expenditure is now urgently needed for electrification, and the requirements in this direction are receiving the serious consideration of the directors of a number of companies. High as existing British railway capitalisation already stands, the difficulty can, however, be got over, if only a thorough settlement of the labour question can be effected.

Trailer Cars.

For a long time we have advocated the use of trailer cars for dealing with heavy traffic. When in 1912 the London County Council sought statutory powers to run such cars—these powers being necessary in order to overcome the opposition of the Metropolitan Police—we published a series of letters from Continental tramway managers showing the great advantages obtained abroad from the use of two-car trains. The County Council obtained from Parliament the powers sought, and during the past year they have been running a few trailer cars. So satisfactory have these proved in helping to deal with heavy traffic during the rush hours, that just before the Christmas adjournment the Council decided to invite tenders for the supply of no fewer than 150 trailer cars. The experimental trailers hitherto used were adapted horse cars, but the new vehicles will be built for the purpose and should show many improvements. Moreover, in the coming session of Parliament, statutory authority to work trailers will be sought by the London United Tramways Company, Bolton

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Corporation, Newcastle-on-Tyne Corporation, and Walsall Corporation. Such authority will remove existing doubt as to getting the consent of the Board of Trade. By the use of two-car trains the carrying capacity of a tramway can be enormously increased, traffic congestion can be diminished, and working expenses per car-mile can be materially reduced.

Liverpool Traffic Situation.

The publication early in the present month of the report by Mr. C. W. Mallins, general manager of Liverpool Corporation Tramways, on the question of congestion of tramway traffic on certain routes, has let loose definite rumours as to schemes for electric railways in Liverpool, under the Mersey to Birkenhead, through the latter town, and over part of the Wirral peninsula. Several years ago the Wirral Railway Company obtained Parliamentary powers to work their railway by electricity, but they have taken no steps to carry any scheme out. More recently, however, vague hints have been heard that something might be done. Then came Mr. Mallin's report (which is published in this issue). He discusses the alternative of a bridge across the Mersey or a tunnel under it, to be used for tramway and general road traffic, and he favours the tunnel, both on the ground of economy, and because it would be more effective in relieving the tramway traffic in the neighbourhood of Liverpool Pier Head. This scheme is to be considered by the various local authorities concerned. Meanwhile it has been the occasion for making public in the local press a rumour that a syndicate is about to approach the municipalities, the Mersey Railway Company, the Liverpool Overhead Railway Company, and other parties interested, with a view to buying the Mersey Railway, making new underground electric railways in Liverpool to link together existing railway termini, acquiring and electrifying the railways in Wirral, and making extensions of them. The story is at least interesting, and if the scheme were developed it would probably prove a big thing, in view of the probable increase of population on the Cheshire side of the Mersey. Meanwhile, as a concrete fact, we have the announcement that the Lancashire and Yorkshire Railway Company are about to make an extension of their electric zone by converting to electric traction the line, about nine miles long, from Manchester to Bury. The third-rail direct-current system, as on the Liverpool and Southport section, is to be employed.

Light Railways.

The Light Railways Act of 1912, amending considerably the original Act, has so far been a failure. It was thought that by removing some of the difficulties arising under the original Act, light railway promotion and construction would be encouraged. At present there is no sign of anything of the sort. In the last half-year only four applications for Orders were made to the Light Railway Commissioners, and two of these are merely for small extensions of lines already authorised. It might have been thought that one provision alone of the new Act would have encouraged promoters. That is the section which enables the Board of Trade, in a case where an Order cannot be confirmed by them, owing to the magnitude of the scheme, or because it would compete with an existing railway, to carry a bill through Parliament confirming the Order. It is to be feared that one cause of the present stagnation is the growth of heavy motor traffic, by which both passengers and goods are now to a large extent conveyed on ordinary roads. Local authorities may yet come to see that it is in their own interest to promote and also to encourage the promotion by others of light railway schemes. By so doing they would minimise the wear of the roads by heavy motor vehicles, and the light railway, whether laid on roads or on its own right of way, would have to maintain its own tracks. The greater facilities now provided ought to smooth the path of local authorities who wish to establish a system of locomotion to serve combined areas. Some attempt ought to be made to put forward a scheme that will induce the Development Commissioners to expend some of their funds. As the Development and Road Improvement Act, 1909, forbids any assistance being given to a project promoted by a company, there is only one method of procedure in the event of local authorities themselves not formulating a scheme. The alternative consists of forming a Development Association, as has been done in Aberdeenshire.

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THE PAST YEAR.

In this country and in some of its dependencies the year 1913 was marked by much greater activity in the field of electric traction than several of its immediate predecessors. The motor omnibus, too, began to develop outside of London, its original home. In regard to traffic, the great bulk of the tramway undertakings of the country have shown substantial increases in receipts, the only exceptions being some of those in the metropolitan area, which have been seriously affected by omnibus competition, and the Dublin tramways, which have had to contend with the dislocation of business associated with the prolonged labourers' strike. Even in the London district, however, tramway receipts are again improving, and the more important undertakings are showing substantial increases.

Taking now construction and equipment developments, and referring first to railways, the official intimation was made in January that the London, Brighton, and South Coast Company had decided to proceed with the electric equipment of an additional 150 miles measured as single track, making 220 miles along with the part already equipped. This work is in progress as far as Croydon, and there is no reason to expect undue delay with the Epsom section. Then the equipment of the London suburban lines of the North Western and the South Western Railways, announced in 1912, is now being rapidly pushed forward. These are great undertakings involving large contracts and much work. In the last session of Parliament about half a dozen bills were passed authorising connecting lines between various London electric railways. These extensions, though not of great length, will be of enormous benefit both to the public and the railway companies. Electric traction was inaugurated at the end of March on the East London Railway, which has connections with several other lines. Abroad, British manufacturers have been interested in the large contracts for the electrification of the Melbourne suburban railways, and the work is now going forward. The promised North Eastern Railway electrification development has not yet advanced, but there are rumours of various railway electrification schemes in the north-west of England which are likely to materialise.

In the domain of tramways, few new systems or large extensions have been opened during the year, but the minor developments have been numerous. Probably the most interesting is the new combined system of tramways and trackless trolley cars at Aberdare, the first systematic combination of rail and railless traction carried out simultaneously. In quite a number of towns extensions of existing tramway systems have been opened. This, together with the growth of traffic, explains the fact that a good many undertakings have, during the year, made substantial additions to their stocks of cars. Manufacturers have also had a good deal to do, both in putting additional power units into generating stations and in substituting turbine machinery for reciprocating engines and slow-speed generators. In another, though a less conspicuous way, there has been a fair amount of work, namely, in providing renewals of equipment for cars and other details. Sufficient time has now elapsed since electric traction began in this country to allow of the demand for renewals being very considerable. Probably it has not yet reached its maximum. In any event, business of this kind, consisting of many small orders instead of a few big ones, attracts little general attention, but it is none the less remunerative.

Another promising feature is the growth of the pay-as-you-enter system of cars. It is now largely employed in Aberdeen, Gateshead, and Leicester, and so well pleased are those concerned with the results that additional cars of the same sort are being ordered. Some other towns which have not adapted their cars for the system, nor bought new prepayment cars, are trying as far as their existing vehicles will allow to collect the fares from the passengers as they enter. The theoretical difficulties of the system when double-deck cars are used appear to be quite overcome.

Trail cars are a novelty of the year, though they are only a revival of a method well known in the old steam-car days, and though they have been used all along in many foreign countries. Acting under Parliamentary powers obtained in 1912 in the face of keen opposition from the police and others, the London County Council began running a few trail cars in February last. At present they have about a dozen, and so useful have they proved in meeting the traffic demands of the rush hours that the Council in December authorised the inviting of tenders for the supply of 150 trail cars, which will be coupled to motor tramcars running all over South London. The success of this big experiment must lead to authority being granted to run two-car trains in North London as well. Another innovation in London—and it also could only be obtained by Parliamentary authority—is the carrying of excess passengers in the cars during busy times and during inclement weather. This came into force last August. Several tramway authorities will seek statutory power in next session to use trail cars. The Board of Trade have sanctioned the running of them at York.

The trackless trolley system has made fair progress during the year. It came into operation in several towns, and it gives much satisfaction. Moreover, a considerable number of Acts authorising its use were passed in the last session of Parliament, so that many new examples of the system should soon be in operation. A fresh crop of bills for next session seeks similar powers. Moreover, besides the various lines equipped on the R.E.T. method, we now have as a result of last year's work two examples of the Cedes-Stoll system, namely, at Aberdare and Keighley, and one of the Bremen system at Stockport. Thus comparisons under actual working conditions will be possible. In London —the Cinderella principle being, as usual, applied to the metropolis—the use of the railless system is barred because of an instruction given by the House of Commons last May to a Committee on the County Council's bill not to sanction the trackless trolley proposals contained in it unless these were consented to by the borough councils concerned. The latest development consists in the Board of Trade for the first time sanctioning a double-deck trackless car, which is now being run in Brighton. During last Parliamentary session the question was raised again as to the promoters of railless trolley schemes having to contribute to the maintenance of the roads on which the vehicles run. No general legislation has been attempted so far, but, in individual cases, it has been provided that where the promoters are not the road authority they are to pay—in most cases a certain sum per mile run, in others an amount to be fixed by arbitration—as a contribution towards road maintenance. The whole matter ought to be speedily dealt with in a comprehensive way, because a company which does not need to get statutory powers to run motor omnibuses can work these vehicles without paying anything for road maintenance. This is the present great grievance in London. Yet the omnibuses do more damage than the trackless cars do.

The motor omnibus during the year reached what must be for the present practically its maximum development in London. This for the reason that all the routes which are worth cultivating are now occupied by

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services of omnibuses. Accordingly, the great increases of traffic receipts as compared with corresponding weeks of the previous year have fallen off, while, on the other hand, by reductions of fares, return tickets, and improved traffic arrangements, the tramway receipts which had fallen off so much are now rising. In the provinces the use of the motor omnibus has spread considerably. These vehicles are now run by various municipalities as feeders to the tramways, and companies are also using them in interurban work. A number of other local authorities got powers in last session to work omnibuses, and more are seeking powers this year. The petrol-electric type is finding increasing favour. There is a wide field for the omnibus, but its development may see a considerable struggle between local authorities and companies. In connection with commercial motor vehicles it is interesting to note that the successful exhibition of machines of this class held in London last July was the first of the kind in the metropolis for five years.

A new development is promised in the shape of the electric vehicle fitted with Edison storage batteries. A British company to supply this famous type of accumulator began business in the latter half of the year.

In the sphere of law we had the decision of the House of Lords on July 24 reversing the judgment of the Court of Appeal in the case of the Tottenham Urban District Council *v.* the Metropolitan Electric Tramways, Limited. The House held that tramways must continue to be rated on their full net annual value, not on one-fourth of it as in the case of railways and light railways. This naturally caused much regret in tramway circles, but even that feeling was overborne by the offence which was given by Lord Moulton's ill-informed remarks to the effect that the construction of tramways under powers obtained by a Light Railway Order was an abuse of the Light Railways Act. Everyone who knows the history of that Act knows that it was from the first intended to include tramways.

A matter causing a certain amount of satisfaction was the agreement reached last summer between the Postmaster-General and the two tramway associations as to the insulation of Post Office wires crossing tramway wires and the allocation of the cost. Guard wires should be fewer in future. In August the report was issued of the Select Committee of the House of Commons on motor traffic dangers in London. The hearing of evidence had extended over a long period, but the recommendations of the Committee gave little satisfaction to those most concerned in and most intimate with the subject. Among the things recommended were the formation of a new Traffic Branch of the Board of Trade which would combine the traffic duties of the Home Office, the Local Government Board, and the Board of Trade, the abolition of the borough councils' veto on tramways, and the granting to all the county councils in the metropolitan area wide power of making traffic by-laws. The proposals are inadequate and still leave multiplicity of control.

The two tramway associations held very successful annual conferences. The Tramways and Light Railways Association met at Blackpool in June and the Municipal Tramways Association at Sheffield in September. Papers of first-class interest and importance were read and discussed, and the proceedings were fully reported in our pages.

During the coming year a great deal of interest is likely to centre round railway electrification and the spread of the trackless trolley and the motor omnibus. At the same time there is a promise of large tramway extensions in Birmingham and Glasgow, and later in London.

BOARD OF TRADE REPORT ON LONDON TRAFFIC.

The sixth annual report of the London Traffic Branch of the Board of Trade was issued on January 10. It forms a Blue Book (Cd. 7.190) of 113 pages with numerous large maps and diagrams, and is published at the price of five shillings. It brings the usual statistical information up to the latest possible date, discusses afresh the various aspects of the traffic problem, and contains some recommendations for the improvement of traffic control. In the present notice we can only touch briefly upon a few of the more important particulars. Dealing with the daily movement of a large section of the people, the report notes that the estimated population of the county of London (which is decreasing) is over 4½ millions. Taking in Greater London, however, (with 7,322,000), and the outer suburban ring to a distance of about 30 miles out, the total population is put at 8,471,146, spread over an area of 2,808 square miles. The following table shows the number of passengers carried in the last ten years by local railways, tramways, and omnibuses.

NUMBER OF PASSENGERS CARRIED BY

Year.	Railway (local companies).	Tramway (approximate).	Omnibus.	Total journeys per head of population.
1903	290,722,680	394,356,531	287,386,471	144·9
1904	298,638,750	431,813,839	288,965,214	150·5
1905	305,052,495	477,944,684	290,665,051	157·0
1906	329,521,648	508,700,269	291,563,048	163·5
1907	356,233,666	589,745,792	330,000,000*	182·9
1908	399,666,339	636,009,090	340,000,000*	195·3
1909	410,744,610	687,138,908	311,000,000*	198·1
1910	425,271,861	763,797,856	377,207,555	218·1
1911	436,498,785	821,819,741	400,628,487	228·8
1912	436,492,548	797,487,581	551,622,398	243·9

* Number of passengers estimated on basis of receipts; are believed to be underestimated.

The figures do not include the vast suburban traffic of the trunk railways, nor the passengers carried by over 10,000 cabs. Adding estimates for the local traffic on trunk railways, it is found that during the year there were 686,492,548 journeys by rail as against 1,349,109,979 for tramways and omnibuses. Thus 66 per cent. of the journeys were by road against 34 by rail. Yet the road system remains as it was a century ago, and congestion and delays are increasing.

Reference is made to the gradual withdrawal of a large amount of traffic of all kinds from the railways to the roads, owing to the development of the motor vehicle, which now accounts for fully 94 per cent. of the passenger vehicles met with on the roads round London.

Upon the subject of street accidents, it is stated that they were an unfortunate phase of the traffic problem, and there was no hope that they could even be entirely eliminated. Since 1904 the total number of street accidents had practically doubled, while the increase of population had not amounted to quite one-tenth. This yearly rate of increase, which is out of all proportion to that of the population, is highly disturbing. This abnormal situation led to the appointment of a Select Committee to investigate the causes. Although conditions are not altogether similar, London, on the basis of either area or population, compares unfavourably in this respect with other English cities, despite the fact that the police control of its traffic is admittedly the best in the world. Statistics show that where traffic is considerable, with a tendency to become congested, the danger rapidly rises, but decreases again gradually as congestion further increases. This fact emphasises the risk involved in mixed traffic by the great variations in the speed of vehicles. Lack of experience on the part of licensed drivers of motor vehicles is undoubtedly a source of danger, but inadvertence on the part of the pedestrian contributes largely to the number of accidents, and the hope of improvement lies to some extent in the better education and experience of both drivers and pedestrians in the altered conditions of present-day traffic. In order that the matter may be more carefully watched, it is extremely advisable that there should be compulsory powers whereby all street accidents resulting in injury should be reported to one authority.

The number of persons killed by various classes of power-driven vehicles during three years is shown below:

Class of Vehicle	1910	1911	1912
Motor cab	37	35	41
Electric tramcar ..	41	33	37
Motor 'bus .. .	70	114	182
Light motor car ..	60	93	85
Heavy motor car ..	36	35	45

The usual traffic census was taken during the year, and it showed among other things that in 1913 6 per cent. of the passenger vehicles

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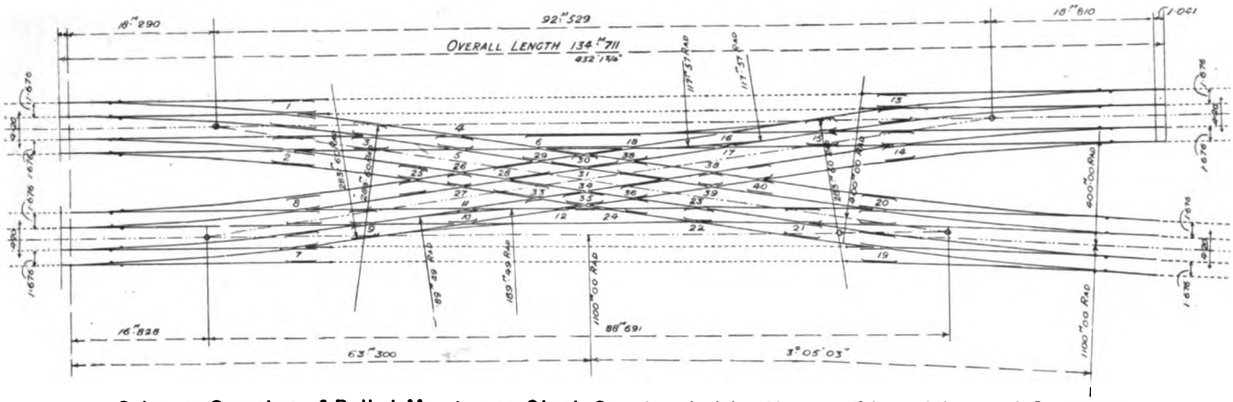
were horse-drawn, compared with 11 per cent. in 1912, and 13 per cent. in 1911, and that in 1913 88 per cent. of the trade vehicles were horse-drawn, compared with 91 per cent. in 1912, and 94 per cent. in 1911. In 1913 there was an increase of 27,682 vehicles over those counted in 1912 at the same points. This was an increase in numbers of 3·28 per cent., but the corresponding volume in units showed an increase of 5·06 per cent., indicating that congestion had advanced more rapidly than the number of vehicles. This increase in numbers and volume was more than accounted for by the extra numbers and the frequency of service of motor omnibuses and tramcars, the increases being 41,837 and 11,661 respectively in the numbers enumerated. Horse and motor vehicles together increased 7·8 per cent. in numbers and 8·7 per cent. in volume.

The scheme of new roads outlined in previous reports is again dealt with and detailed information and statistics follow as to the numbers of various classes of public carriages, and reference is made to their work. Particulars are also given regarding electric railways, and Acts passed for them last year.

A RAILWAY CROSSING OF ROLLED MANGANESE STEEL.

The accompanying drawing shows a special manganese steel scissors crossing which has been made for the Buenos Ayres Great Southern Railway and will be used at Avellaneda in connection with the quadrupling of the line from the first to the sixth kilometre. The crossing has been produced by Messrs. Edgar Allen and Company, Sheffield, in their "Imperial" patent rolled manganese steel, and the rails weigh 100 lb. per yard. The lay-out comprises eight sets of 18-ft. switches, four sets of 12-ft. switches, 20 acute crossings, 14 obtuse crossings, two compounded triple crossings, and also closure rails. The whole work thus includes eight turnouts and eight diamonds, two of which have slip-roads. The total length of the cross-over is 432 ft. 1¾ in. (134 m. 715), and the width at one end is 63 ft. 5⅝ in. (19 m. 345), and at the other end is 64 ft. 3⅛ in. (19 m. 586). This is, we believe, the largest manganese steel crossing which has ever been manufactured, and it has attracted much attention from railway engineers.



Scissors Crossing of Rolled Manganese Steel, Constructed by Messrs. Edgar Allen and Company.

The gauge of the tracks is 5 ft. 6 in. (1 m. 676), and the distance centre to centre between the up and down tracks 13 ft. 9⅜ in. (4 m. 200). The two main line tracks on the top are straight throughout, but the bottom main line tracks are straight for 211 ft. 1¼ in. (64 m. 341) only, the remainder curving outwards with a radius of 3,609 ft. (1,100 m.) at the centre of the tracks.

The cross-over roads lead out of the straight main line with 18 ft. switches and a curve of 930 ft. 5 in. (283 m. 600) radius, and out of the curved main line portion with 18 ft. switches and a radius of 1,312 ft. 4 in. (400 m.), the intermediate portion of cross-over tracks being straight. The single slips for the top pair of main line tracks have a radius of 385 ft. 8¾ in. (117 m. 57), and the one for the bottom main line tracks a radius of 621 ft. 8¼ in. (189 m. 49), both slips having two pairs of 12 ft. slip switches.

All the rails used in the construction of the lay-out are of manganese steel, with the exception of the ordinary check rails, which are of high carbon steel. Upwards of 100 tons of Allen's "Imperial" patent rolled manganese steel rails have been used in the construction of the cross-over.

The switches and crossings have been made to the standard design of the railway company for ordinary steel rails. The stock and tongue rails for the switches and the point and splice rails in the crossings have been treated by special machinery, and fitted together in precisely the same way as in the construction of switches and crossings when made from Bessemer rails.

Special attention may be drawn to the two compounded triple crossings, one weighing about 2½ tons and the other about 1 ton 12 cwt. The one forms two acute crossings, angles 1 in 7·4 and 1 in 7·207, and an obtuse crossing 1 in 3·668, and is composed of a double-angled wing rail 31 ft. 6 in., one end being set to an angle of 1 in 7·4, and the other end set to an angle of 1 in 7·207; a long point rail 21 ft. 8⅛ in. long, machined both ends, one end giving an angle of 1 in 7·4, and the other end 1 in 7·207; a splice rail 19 ft. 3 in. long, machined to correspond and fit into the above point rail, and set in the centre to an angle of 1 in 3·668, thus forming the main rail for the obtuse crossing, 1 in 3·668; a wing rail 14 ft. 9¾ in. long, set to an angle of 1 in 7·4, with check end machined to form splice for obtuse crossing point rail; a wing rail 20 ft. 0⅛ in., set to an angle of 1 in 7·207, and machined as the above wing rail; two obtuse crossing point rails 8 ft. 11¾ in. and 8 ft. 7¾ in. long, respectively machined to give an angle of 1 in 3·668; a guard rail 15 ft. long, set to an angle of 1 in 3·668. The whole is fastened together with cast-iron crossing and check blocks, and ⅞ in. diameter bolts with lock washers.

The construction of the second triple crossing is similar to the first one, with the exception that a cast manganese centre-piece is substituted for the long point and splice rails forming the vees for the acute crossings, as the distance between the two crossing noses is so short that it was not possible to follow the built-up design used in the first case. There is also some special construction in the slip-roads referred to previously.

Messrs. Edgar Allen and Company, Limited, are the only firm constructing crossings, switches, and lay-outs entirely from rolled manganese steel rails, and the results which are being obtained from this material on very important lay-outs are marvellous, giving a very much increased life and perfect running.

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TRAFFIC PROBLEMS IN LIVERPOOL.

A Report by Mr. C. W. Mallins

(General Manager of Liverpool Corporation Tramways).

Proposed Tramway Tunnel Under the Mersey.

The following is the text of a report by Mr. C. W. Mallins, general manager of Liverpool Corporation Tramways, on tramway traffic problems, which was presented to the Corporation early this month.

Pursuant to the following resolution of the City Council, of October 1, moved by Councillor C. H. Brunner, J.P., seconded by Alderman J. G. Taggart, J.P., viz.:

> "That it be an instruction to the Tramways and Electric Power and Lighting Committee to forthwith set about providing more cars with a view to relieving the overcrowding there now is at certain times, and to securing for all passengers what their fares entitle them to, *i.e.*, a seat from the commencement to the end of their journey,"

and to the following resolution of the Tramways and Electric Power and Lighting Committee, on consideration of the same, on October 10, viz.:

> "That the same be referred to the general manager to report,"

the general manager begs to report that he has carefully considered the points raised in the above resolution, and finds the same difficulties present which have always existed in connection with the solution of the problem of finding seats for all passengers during the maximum traffic hours. The difficulty is not peculiar to the Liverpool system, as it is to be found on every tramway system of any importance throughout Great Britain, and, indeed, on the continents of Europe and America, where there does not appear to be any limit to the number of passengers allowed to stand on the cars. This congestion is undoubtedly brought about by the introduction of electric traction, with its cheap and rapid transit, enabling the working masses to avail themselves of the cars when proceeding to and from their work, which only occurs during a limited range of hours.

The subject has been receiving the attention of the British tramway authorities for a number of years, but, unfortunately, up to the present, it has been found quite impossible to obviate the difficulty. To the ordinary observer this may appear strange, but there are two potent factors which have to be taken seriously into consideration by the committee responsible for dealing with the matter, viz., public convenience and economical considerations. It is perfectly clear that to prohibit standing on the cars during the crush hours would cause very serious inconvenience to a large section of the working-class community, who, generally speaking, do not appear to complain seriously of the inconvenience suffered by having to stand, but this is not surprising, because, according to observations taken by the general manager, the time that passengers have to stand is but limited, and does not on the average amount to 10 minutes in each case. The great majority of the travelling public recognise the advantage of each car being allowed to carry a few extra passengers during rush hours, an advantage which, in the opinion of many, far outweighs any inconvenience which individual passengers consider they have to suffer by standing being permitted.

Those not acquainted with the practical difficulties may naturally say that it is simply a matter of placing more cars in service, but in that connection the general manager would point out that the committee, like all other tramway authorities, are faced with the difficulty that the maximum traffic only averages about 3½ hours per day in two periods, and, in order to provide a seat for each passenger during these hours, 120 additional cars would be required, and 120 drivers, 120 conductors, and 70 shed assistants would be necessary to man and clean the cars, making a total of 310 additional men, who could only be found useful employment about 3½ hours each day. Although the number of hours which these men could be usefully employed is so very limited, still the general manager is of opinion that they would have to be paid full time at the minimum rate of pay at least, as it is quite obvious that such a large number of men could not be kept permanently engaged at about a third of the rate of pay received by the other men employed in the department.

Dealing with the financial aspect of the provision of the necessary additional cars, the committee will observe that the approximate cost per car would be £700, and a sum of £5,000 would be required to provide shed accommodation, or a total capital expenditure of £89,000, entailing an annual interest and sinking fund charge of £8,561, and an annual sum of £5,242 would be required for reserve, renewal, and depreciation, and operating expenses would amount to about £43,265, making a total additional annual expenditure of £57,068, without any corresponding increase in the revenue; and even with this heavy additional expenditure the crush traffic could not be as expeditiously dealt with as under the present arrangements, by which every car in service takes a portion of such traffic, as compared with the proposed additional service, which could only relieve the pressure to a limited extent.

The general manager is of opinion that the best method of dealing with the difficulty, or at any rate of minimising it, is to increase the seating capacity of all future cars built, to the extent of being as near as possible equal to the combined seating capacity and the number allowed to stand in the existing cars, and by that means obviate the standing difficulty without increasing the number of cars in the streets. The committee are, at the moment, experimenting with a type of car which the general manager believes will meet these requirements, and which could be adopted as the rolling stock came up for renewal, if the committee so desire.

For the information of the committee, the general manager has communicated with and received replies from 72 tramway authorities throughout Great Britain, all of whom experience the same difficulty, either in a greater or lesser degree, and all of whom permit standing on their tramcars, viz.:

Aberdeen.	Dundee.	Oldham.
Ashton-under-Lyne.	Derby.	Preston.
Ayr.	Darlington.	Portsmouth.
Belfast.	Exeter.	Pontypridd.
Birkenhead.	Glasgow.	Plymouth.
Birmingham.	Gloucester.	Rochdale.
Blackburn.	Great Yarmouth.	Rotherham.
Blackpool.	Halifax.	Salford.
Bolton.	Huddersfield.	Sheffield.
Bournemouth.	Haslingden.	Stalybridge.
Bradford	Hull.	Stockport.
Brighton.	Ipswich.	Sunderland.
Burnley.	Leeds.	South Shields.
Bury.	Leith.	Southend-on-Sea.
Burton-on-Trent.	Lincoln.	Southport.
Cardiff.	Lowestoft.	Southampton.
Chesterfield.	Leicester.	Swindon.
Croydon.	London.	Walsall.
Coventry.	Maidstone.	Walthamstow.
Chester.	Manchester.	West Ham.
Colchester.	Newcastle-upon-Tyne.	West Hartlepool.
Darwen.	Northampton.	Wallasey.
Doncaster.	Newport.	Wigan.
Dover.	Nottingham.	York.

The general manager desires to call the attention of the committee to the further difficulty in connection with the operation of any additional cars, viz., the congested condition of the central area of the city, which is at present taxed to its utmost capacity, and any considerable increase in the number of cars traversing that area would bring about a state of congestion which would render it impossible to operate the system with any degree of regularity. Even under the present conditions the tramway traffic suffers very serious obstruction during the maximum traffic hours, often disorganising the service on the various routes, and rendering it impossible to run the cars to scheduled time, with the result that complaints of the irregular intervals are made by the public, and, furthermore, the cars are not operated under the most economical conditions. The headway available in the centre of the city is so small that the cars can only move at a slow pace, resulting in a considerable loss in the use of the cars, and in consumption of current and serious injury to the electrical equipment, apart from the loss of time to the travelling public. The committee at various times have attempted to obviate the congestion difficulty in Church Street and Lord Street, and also in Dale Street and Water Street, by making Lime Street or Old Haymarket the terminus for certain of the cars. These experiments failed on all occasions, the result in each case being the same, viz., the cars travelling the longer distance to and from the Pier Head became overcrowded, resulting in serious complaints, whilst the short-distance cars, which made Lime Street or Old Haymarket their terminus, were not half-filled, and were, consequently, run at a loss, and the service therefore had to be discontinued on each occasion. The special lines in Lime Street, Old Haymarket, and the neighbourhood were constructed at a very considerable expenditure for the purpose of dealing with the short distance traffic, but, unfortunately, the public refused to adapt themselves to the cars provided to deal with this class of traffic, with the result before mentioned.

Having regard to the foregoing facts, and also to the ever-increasing volume of traffic to the Landing Stage and centre of the city, the committee might consider the desirability of providing a third tramway route to the river, as there can be no doubt that the two existing routes, viz., Church Street, Lord Street, and James Street, and Dale Street and Water Street, respectively, are very much congested, and, as before stated, cause considerable loss to the department, and inconvenience to the public. The third route to the Pier Head could be provided by widening certain streets in the central area of the city, and the construction of the necessary permanent way and overhead equipment, or, in the alternative, by the construction of a subway from the Old Haymarket to the Landing Stage, equipped with the necessary appliances to enable passengers to enter and leave the subway at

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convenient points upon the route without difficulty. If either of these schemes were adopted, a considerable percentage of the cars now traversing Lord Street and Dale Street, respectively, could be diverted *vii* the new route, thus relieving the congestion which now exists, and also making provision for any additional number of cars which the exigencies of the service may require in the future. Either of these schemes would involve a large sum in capital expenditure, but the traffic congestion problem is becoming so urgent that the solution cannot much longer be delayed.

In dealing with the matter the committee may take even a more comprehensive view of the whole question of the cross river traffic, which is at present dealt with by a very excellent system of ferry boats, no doubt the best that it is possible to provide, but the growth of the city and surrounding boroughs has been so rapid in later years that it is quite impossible for any ferry boat system to deal satisfactorily with the enormous volume of cross river traffic. It is therefore perfectly clear that the great communities on both the Lancashire and Cheshire sides of the Mersey suffer very considerable inconvenience through the lack of modern transport facilities, both as regards passenger and vehicular traffic, and, as suggested by Sir Charles Petrie, Sir Harmood Banner, our present Lord Mayor, and other leading citizens from time to time, the committee might seriously consider whether the time has arrived when the whole of the authorities on both sides of the river should be invited to co-operate in the provision of a highway to connect the communities which constitutes Mersey City. This could be accomplished by either the construction of a tunnel or the erection of a bridge, and if either method were adopted, it would be necessary to make ample provision for a very frequent tramway or train service, and also for a great volume of ordinary vehicular traffic. Among the difficulties which the general manager recognises in connection with the provision of a bridge would be the fact that it would cause a certain amount of obstruction to the navigation of the river, and also the fact that it could not be carried sufficiently far into the city to relieve the congested area without causing what some persons might consider a serious obstruction in the streets and an eyesore to the public. To be of any real value in dealing with the congestion in the central area, the bridge would have to be carried to some point in the neighbourhood of Lime Street, a proposition which the general manager fears would not be entertained for the reasons given and also owing to the enormous cost of construction. Even to construct a bridge from the Cheshire side to St. George's Crescent, or some point in the neighbourhood, which could not in any way assist in relieving the congestion in the centre of the city, would make the length of such bridge and its approaches, with the necessary connections with Wallasey and Birkenhead, approximately 3,450 yards, which would be 1,445 yards longer than Brooklyn Bridge, U.S.A., and 1,165 yards longer than Manhattan Bridge, U.S.A., and any additional length of the bridge which might be carried into the centre of the city, for the purpose of relieving the traffic congestion, would proportionately increase the cost of construction and maintenance. For the information of the committee, the general manager submitted particulars of the cost of construction and other details of the two bridges referred to, which are probably the most important in the United States, and span East River, New York, at different points.

To erect a bridge across the Mersey of the necessary dimensions and stability to deal adequately with the cross river traffic would, in all probability, cost a sum even larger than that expended on the erection of either of the United States bridges, because, as before stated, the Mersey bridge would have to be about 1,200 yards longer to deal adequately with the cross river traffic, without making any provision for dealing with the congested area of the city. It may, however, be contended that material and labour are more costly in the United States than in this country, but even making due allowance for any difference that may exist, it is reasonable to assume that a bridge of the necessary dimensions, together with the cost of land for approaches, and all other initial expenses, including rolling stock, would cost approximately between £5,000,000 and £6,000,000 to erect, entailing an annual interest and sinking fund charge of £213,000, train operating expenses £13,500, and maintenance and general contingences, say, £50,000, making a total of £276,500. In order to secure this revenue, about 56,000,000 of passengers at, say, 1d. each would have to be carried annually by the trains operating over the bridge, and also about 900,000 vehicles at, say, an average of 1s. per vehicle. It is not probable that this amount of traffic would be forthcoming during the early years of the operation of the bridge, having regard to the fact that the total number of passengers carried by the Wallasey and Birkenhead Ferries only amounted to 30½ millions during the year 1912, with about 850,000 vehicles. The balance of the standing charges and operating expenses, amounting to about £107,000, without allowing for depreciation, would therefore have to be contributed by the combined authorities.

In the alternative, if a tunnel or subway was constructed, commencing at the Old Haymarket and carried to the Landing Stage, with the necessary approaches at convenient points along the route, it would be found to be of great utility to passengers, and would solve the congestion problem in the central area of the city, and could be continued under the Mersey to the Cheshire side, terminating at a convenient point in Seacombe, and, if considered necessary, a branch could be constructed to Birkenhead, terminating at a convenient point in the neighbourhood of Hamilton Square. At some future time, if the Cheshire authorities so desired, the line could be continued across the Wirral Peninsula to the River Dee, thus linking up the residential districts of North-West Cheshire with the centre of the city of Liverpool by an up-to-date electric railway, the tunnel to be so constructed as to afford ample facilities for a train service capable of coping with the maximum passenger traffic, and also capable of dealing with the maximum volume of other vehicular and pedestrian traffic. The train traffic and the other classes of traffic would have to be separated, as the trains would be run at a high speed whilst in the tunnel.

The approximate length of the tunnel would be 2½ miles, and would probably cost about £1,200,000 per mile to construct and equip, inclusive of all charges such as rolling stock, Parliamentary and contingent expenses, etc., or a total capital expenditure of £3,000,000, entailing an annual interest and sinking fund charge of £116,000, £75,000 for maintenance, pumping arrangements, etc., and operating expenses £13,500, or a total annual expenditure of £204,500; and in order to secure this amount it would be necessary to carry about 45,000,000 of passengers through the tunnel at, say, 1d. each, with about 1,000,000 vehicles at, say, an average of 6d. each. It is doubtful whether this amount of traffic would be obtainable during the first year or two of the operation of the tunnel, on the basis of the present cross river traffic, but the general manager has no doubt that, with the growth of the city and surrounding districts, it would be forthcoming as soon as the great utility of such a highway was discovered by the public, and, indeed, it is quite probable that inside a very few years it would not be necessary to charge any toll on ordinary vehicles using the tunnel, as the passenger traffic receipts would increase to such an extent as to be able to pay all charges in connection with the operation of the tunnel and, in addition, show a profit.

The Old Haymarket is admirably situated for connecting a tunnel with the Liverpool tramway system owing to its central position, which is easy of access, either to north, south, or east, and to which connections already exist, and, in addition, the position lends itself to a moderately easy grade to the centre of the river, which would enable all classes of traffic to enter and leave the tunnel with comparative ease. If such a tunnel were constructed, the whole of the vehicular traffic which now crowds Church Street and Lord Street, and also Dale Street and Water Street, proceeding to and from the Cheshire side, would be diverted by the tunnel.

The general manager recognises the magnitude of the scheme and fully appreciates the difficulties which would have to be surmounted before it could be accomplished, but the advantage which would accrue from the provision of a highway of this character to the port of Liverpool and the inhabitants generally of Mersey City cannot be overestimated. The construction of such a highway would only be in keeping with the enterprise and progress of the port, and, having regard to the position which Liverpool occupies as second city of the greatest Empire the world has ever known, to which the eyes of the civilised world are always turned, it would be a fitting tribute to her enlightened rulers to accomplish this great enterprise in the second decade of the twentieth century.

The general manager would respectfully point out that the figures given in this report, in connection with the provision of a bridge or tunnel, are approximate, and are only given as a mere outline of what such schemes would possibly cost.

ST. PETERSBURG TRAMWAYS.

The St. Petersburg Town Council contemplates the purchase of 130 motor cars and 130 trailers for the second system of tramways. The cost is estimated at 2,285,800 roubles (£242,786). It is proposed to give the order to two Russian houses, the Sormoff and Kolomensk works, which have joined hands in order to carry this business through.

A statement issued shows that the system is much hampered for want of rolling stock. There are now 440 motor cars in circulation and 290 trailers. Next year's receipts are expected to reach 18,095,085 roubles (£1,922,600), almost entirely from the electrified lines. There are a few miles still worked by horse or steam power. During the past season 26 versts (17 miles) were added to the track.

Medals for Twenty Years' Service.—Entries are being received by the Glasgow tramways manager for a competition for the best design of badge to be given to motormen and conductors with twenty years' service.

Large Outlay to be Made at York.—The Council decided on January 5 to apply to the Board of Trade to extend the limit of the amount which the Council are authorised to borrow by the York Light Railways Order, 1908, and the Extensions Order, 1912. The amount by which the limit is proposed to be extended is £71,650, which is required for car sheds, dwellings of employees, and new offices for tramway and electricity purposes.

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TRACTION BILLS FOR 1914.

Electric Railways, Tramways, Railless Lines, and Motor Omnibuses.

The following are abstracts of the Parliamentary notices of the private bills relating to tramways, electric railways, and omnibuses for the next session, which begins on February 12:

Aberdeen Corporation.—To enable the Corporation, among other things, to construct about two miles of additional tramways, to run trackless trolley vehicles on two specified routes, to work motor omnibuses on any route within the city and on three specified routes outside the city, and to apply the free surplus revenue of the tramway undertaking to the Common Good of the city, or towards the reduction of the rates, or in carring out city improvements. Solicitor—Wm. Gordon, LL.D., town clerk, Aberdeen. Parliamentary agents—Martin and Company, 27, Abingdon Street, Westminster.

Birkenhead Corporation.—To enable the Corporation to run motor omnibuses in the borough and in neighbouring districts, and to acquire lands and erect buildings and shelters for the purpose. Solicitor—James Fearnley, town clerk, Birkenhead. Parliamentary agents—Sherwood and Company, 22, Abingdon Street, Westminster.

Birmingham Corporation.—To enable the Corporation, *inter alia*, to construct 17 additional tramway lines of a total length of about 20 miles, to run motor omnibuses in the city, and to widen streets. Solicitor—E. V. Hiley, town clerk, Birmingham. Parliamentary agents—Sharpe, Pritchard, and Company, 9, Bridge Street, Westminster.

Bolton Corporation.—To empower the Corporation among other things to construct about 2¼ miles of additional tramways, to run trailer cars and also special cars for special purposes, to carry by trucks on the tramways refuse, road materials, coal, and any other articles required for use by the Corporation, to work motor omnibuses in the borough, and to widen streets. Solicitor—Samuel Parker, town clerk, Bolton. Parliamentary agents—Dyson and Company, Caxton House, Westminster.

Bournemouth District Railless Traction.—To incorporate a company and to authorise it to work trackless trolley vehicles on two routes in Bournemouth, to acquire land for a generating station, to run omnibuses, and to enable the company to sell and Bournemouth Corporation to buy the undertaking of the company. Solicitors—Mooring, Aldridge, and Haydon, Westover Chambers, Bournemouth. Parliamentary agents—Baker and Sons, 35, Parliament Street, Westminster.

Bristol Corporation (Tramways).—To empower the Corporation to work any tramways within or outside the city of Bristol which they may hereafter acquire or construct or which may be leased to them, and to enter into agreements with the Bristol Tramways and Carriage Company or other body for purchase, leasing, or working by the Corporation of tramways, whether the tramways are compulsorily purchasable by the Corporation or not. Solicitor—E. J. Taylor, town clerk, Bristol. Parliamentary agents—Dyson and Company, Caxton House, Westminster.

Central London Railway.—To authorise the company to enlarge their tunnels under Holborn, to make subways at Shepherd's Bush, Oxford Circus, and the Bank of England, to acquire lands, to raise additional capital, and to issue warrants to bearer. Solicitors—Ashurst, Morris, Crisp, and Company, 17, Throgmorton Avenue, E.C. Parliamentary agents—Sherwood and Company, 22, Abingdon Street, Westminster.

Chesterfield Corporation.—*Inter alia* to enable the Corporation to construct two additional tramways and to widen streets. Solicitor—Jno. Middleton, town clerk, Chesterfield. Parliamentary agents—Stevens, Son, and Parkes, 22, Bedford Row, London, W.C.

Cleckheaton Urban District Council.—*Inter alia* to enable the Council to run motor omnibuses within the district and outside of it on two routes to connect with termini of the Yorkshire (Heavy Woollen District) Tramways at Liversedge and Gomersal. Solicitors—J. H. Linfield, clerk to the Council, and Clough and Crabtree, Cleckheaton. Parliamentary agents—Torr, Durnford, and Company, 2, Millbank House, Westminster.

Glasgow Corporation (Water, Tramways, etc.).—To authorise the Corporation, among other things, to construct numerous additional tramways, largely consisting of suburban extensions and including lines extending as far as Milngavie and Coatbridge, to give to the Corporation running powers over part of the lines of the Airdrie and Coatbridge Tramways Company, to authorise new streets and street improvements, and to enable the Corporation to run omnibuses. The total length of tramways proposed is 21 miles 30 chains, practically all double track. Solicitor—J. Lindsay, town clerk, Glasgow. Parliamentary agents—Martin and Company, 27, Abingdon Street, Westminster.

Leeds Corporation.—Among other things to enable the Corporation to widen streets, to construct eight additional tramway lines within and outside the city, to work trackless trolley vehicles on four additional routes within and outside the city, to run motor omnibuses within the city, and to acquire lands. Solicitor—R. E. Fox, town clerk, Leeds. Parliamentary agents—Sharpe, Pritchard, and Company, 9, Bridge Street, Westminster.

London County Council (Tramways and Improvements).—To enable the Council to construct four lengths of tramways, including Charles Street to Ludgate Circus, Aldgate to near Mark Lane, Aldgate terminus to Aldgate Station, and Lee Green to Eltham; to widen streets, to acquire lands, and to provide for the working by the Council of certain portions of tramways recently acquired or about to be acquired. Solicitor—Laurence Gomme, clerk of the Council, County Hall, Spring Gardens, S.W. Parliamentary agents—Sherwood and Company, 22, Abingdon Street, Westminster.

London Electric Railway.—To authorise the company to construct subways at Tottenham Court Road, Piccadilly Circus, and Trafalgar Square, to acquire lands, to raise additional capital, to increase the rate of interest on unissued preference stock, and to issue stock certificates to bearer. Solicitors and Parliamentary agents—Bircham and Company, 46, Parliament Street, Westminster.

London United Tramways.—To empower the company and any other company or any local authority owning or working tramways to enter into agreements with regard to the leasing, working, and maintenance of the tramways or light railways of the contracting parties, the interchange of traffic, the supply of rolling stock and motive power, and the apportionment of tolls; to authorise through tickets and bookings, and the postponement of the time of purchase of tramways, to enable any local authority to lease tramways to the company, to enable the company to carry excess passengers in the cars, and to run coupled and trailer cars, reserved cars, and cars for special purposes. Solicitors—Stanley, Washbrough, Doggett, and Baker, St. Stephen's House, Westminster. Parliamentary agents—Dyson and Company, Caxton House, Westminster.

Manchester Corporation.—To authorise the Corporation, *inter alia*, to widen streets, to extend the time for the completion of authorised tramways, to run omnibuses inside and outside the city, and to acquire lands for the erection of an electric generating station at Davyholme. Solicitor—Thomas Hudson, town clerk, Manchester. Parliamentary agents—Sharpe, Pritchard, and Company, 9, Bridge Street, Westminster.

Metropolitan and Great Northern Railway Companies.—This bill, which is promoted jointly by the Metropolitan and Great Northern Companies, seeks to constitute and incorporate a Joint Committee of directors of the two companies, to constitute the Joint Committee and railway company; to provide for the leasing to the Joint Committee by the Metropolitan Company of the undertaking of the Great Northern and City Railway Company, which was vested in the Metropolitan Company by their Act of 1913; to vest in the Joint Committee powers of the Act of 1913 to construct an extension railway in the City of London, to provide for the construction and maintenance by the Joint Committee of the above railway and also railways proposed in the bill. Solicitors—C. de W. Kitcat, 32, Westbourne Terrace, Paddington; R. Hill Dawe, 1, The Abbey Garden, Westminster. Parliamentary agents—W. and W. M. Bell, 3a, Dean's Yard, Westminster; Dyson and Company, Caxton House, Westminster.

Middlesex County Council (Western Road and Improvements and Finance).—To authorise the Council to make a new roadway from a junction in the parish of Heston with the Bath Road to a junction with High Road, Chiswick, a widening of Syon Lane in the parish of Isleworth, and a new road in that parish from a junction with Syon Lane to the junction of London Road with Twickenham Road at Busch Corner. It is also proposed to acquire lands and buildings, to prohibit the use of the new roads for the purpose of tramway, light railway, trolley vehicle, motor and other omnibus service, and to provide that no application shall be made for powers to work any such service or to construct any tramway or light railway on the new roads except with the consent of the Council, and to empower and if thought fit to require the Brentford and Heston and Isleworth Urban District Councils to construct and maintain or to contribute to the cost of construction and maintenance of the new roads or parts of them. Solicitor—E. S. Freeland, 46, Queen Anne's Gate, Westminster. Parliamentary agents—Sherwood and Company, 22, Abingdon Street, Westminster.

Newcastle-upon-Tyne Corporation.—To enable the Corporation to construct about 4¼ miles of new tramways (single line) in the urban districts of Longbenton and Weetslade, to provide for an appeal to the Board of Trade against a refusal by a local authority of consent to the construction of the tramways and an appeal to a petty sessional court against a refusal by an owner, lessee, or occupier of consent to any attachment to a house or building, to authorise the use of trailer cars and the running of motor omnibuses through Longbenton, to authorise the Corporation to run special cars or services of cars on special occasions and to charge higher fares on such cars. Solicitor—A. M. Oliver, town clerk, Newcastle-upon-Tyne. Parliamentary agents—Dyson and Company, Caxton House, Westminster.

Newport Corporation—To authorise the Corporation among other things to construct additional tramways, to build a new bridge across the River Usk, and to run motor omnibuses within and beyond the

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borough. Solicitor—A. A. Newman, town clerk, Newport (Mon.). Parliamentary agents—Rees and Freres, 5, Victoria Street, Westminster.

North Eastern Railway.—Among other things to authorise the company to work trackless trolley vehicles from Newcastle to Gateshead along the roadway on the company's high-level bridge. Solicitor—R. F. Dunnell, York. Parliamentary agents – Sherwood and Company, 22, Abingdon Street, Westminster.

North and South Shields Railway.—To incorporate a company and to authorise it to construct an underground electric railway from North Shields, passing under the River Tyne; to acquire lands in South Shields and to erect an electric generating station thereon. (This is a revival of a scheme which was authorised by an Act passed in 1902, but which was never carried out.) Solicitors and Parliamentary agents—Baker and Sons, 35, Parliament Street, Westminster.

Norwich Electric Tramways.—To authorise the company to construct six new tramways, and two doublings and two deviations of existing lines, to widen streets and acquire lands, to abandon and take up certain existing tramways, to run motor omnibuses, vans, etc., and to raise further capital. Solicitors—Mills and Reeve, 69, London Street, Norwich. Parliamentary agent—John Kennedy, W.S., 25, Abingdon Street, Westminster.

Oxford and District Tramways.—To enable Oxford Corporation and the City of Oxford Electric Tramways, Limited (the promoters), to enter into agreements for the sale to the Corporation of the existing tramways and their removal by the Corporation, the provision and working by the company of motor omnibuses, to provide that any agreement may include provisions for the payment by the company to the Corporation of any annual sum and for the company having the exclusive right of working motor omnibuses in the city, and to extend the time for the completion of authorised tramways. Solicitors and Parliamentary agents—Lees and Company, Palace Chambers, Bridge Street, Westminster.

Poole, Sandbanks, and Westbourne Railless Traction.—To enable the Sandbanks Railless Electric Car Company, Limited, to run trackless trolley vehicles on four routes in Poole, to erect the necessary poles, wires, etc., and to acquire lands and erect a generating station. Solicitors—Dickinson, Gwatkin, and Manser, Lloyd's Bank Chambers, Poole. Parliamentary agents—Wyatt and Company, St. Stephen's House, Westminster.

Preston Corporation.—*Inter alia* to enable the Corporation to make three new streets, to construct five additional tramways in Preston and Fulwood, to use lands now belonging to them for the erection of offices and car sheds adjoining the existing generating station and sheds, and to run motor omnibuses within the borough. Solicitor—Alfred Howarth, town clerk, Preston. Parliamentary agents—Sherwood and Company, 22, Abingdon Street, Westminster.

Reading Corporation.—To enable the Corporation to make two additional tramways, to work trackless trolley vehicles on five specified routes in the borough, and to run motor omnibuses within the borough. Solicitor—W. S. Clutterbuck, town clerk, Reading. Parliamentary agents—Sharpe, Pritchard, and Company, 9, Bridge Street, Westminster.

Sheffield Corporation.—To enable the Corporation among other things to carry out 11 street widenings, to construct a tramway, and to extend the powers of the Corporation under their Act of 1907 to run motor omnibuses so that they may be able to run these vehicles in specified districts outside the city. Solicitor—W. E. Hart, town clerk, Sheffield. Parliamentary agents—Sherwood and Company, 22, Abingdon Street, Westminster.

St. Anne's-on-the-Sea Improvement.—Among other things to authorise the Urban District Council to run omnibuses, and to make by-laws for regulating the routes which may be used by motor omnibuses. Solicitor—Thomas Bradley, clerk to the Council, St. Anne's-on-the-Sea. Parliamentary agents—Baker and Sons, 35, Parliament Street, Westminster.

Skegness Urban District Council.—Among other things to enable the Council to run motor omnibuses. Solicitor—W. Frearson, Skegness. Parliamentary agents—Baker and Sons, 35, Parliament Street, Westminster.

Walsall Corporation.—To enable the Corporation to make a new street and lay a tramway on it, to work coupled and trailer cars on the tramways, to run trackless trolley cars on four specified routes within and outside the borough, to work motor omnibuses in the borough and also along the trackless trolley routes and beyond, and to use trackless trolley vehicles for road watering, for the conveyance of scavenged matter and road metal, and for other sanitary or municipal purposes. Solicitor—Herbert Lee, town clerk, Walsall. Parliamentary agents—Sharpe, Pritchard, and Company, 9, Bridge Street, Westminster.

York Corporation.—To authorise the Corporation, among other things, to work trackless trolley vehicles on four routes in the city, to work motor omnibuses throughout the city, and to exempt special carriages or services of carriages from the restrictions as to fares contained in the York Corporation Light Railways Orders, 1908 and 1912. Solicitor—P. J. Spalding, town clerk, York. Parliamentary agents—Sharpe, Pritchard, and Company, 9, Bridge Street, Westminster.

SPENCER AIR CLEANERS.

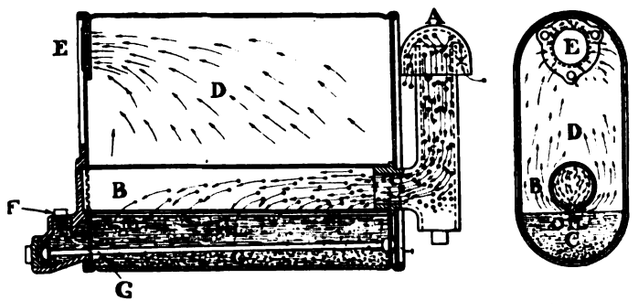
Experience has shown that it is impossible to obtain anything like efficiency with any form of air compressor unless the air is absolutely free from dust and grit. In all the best compressors every reasonable precaution is taken to protect the bearings from dirt, yet there is always the possibility of foreign matter finding its way even to these when the intake air is more or less charged with dust. Dirt and grit reaching the interior of the cylinder in this manner results in the scoring of the cylinder bore and piston rod, rapid wear of the inlet and discharge valves on their seats, and through the accumulation of dirt on the valves and seats and the oil ports, the obstruction of the air passages. It is obvious that all this must mean the loss of that close adjustment so necessary to efficient working, and that the rapid wear and rapidly increasing leakage quickly results in loss of capacity and consequently increased cost of upkeep.

The "Spencer" air cleaner removes all dust and grit from the air before it reaches the compressor, and it is claimed to increase the life

of the compressor four to five hundred per cent., beside ensuring the maximum efficiency for an indefinite period at a constant saving of power.

This air cleaner works upon a novel principle, based on the combination of deflecting and expanding the incoming dirt-ladened air, and having it impinge in a thin sheet on the surface of an adhesive liquid such as oil to which the dirt adheres, thus allowing the clean air to flow without restriction through the expansion chamber, thence to the air compressor. The size of inlet and discharge, and the dimensions of the slot, are carefully proportioned to give just the right velocity to the entering air without any restriction of the air intake or loss of capacity. The oil is not blown aside by the air but is simply agitated sufficiently to give it a gentle circulation which carries the solid impurities deposited by the air to the bottom of the tank, thus constantly exposing a clean surface of oil to the entering air.

In practice it has been shown that the evaporation of the oil is so slight that one charge of oil will last for many months without renewal,



A—Air inlet.
B—Discharge tube with slot in bottom.
C—Air.
D—Expansion chamber.
E—Clean air outlet.
F—Hole for filling.
G—Clean out hole.

and also that the solid matter remains at the bottom of the shell and does not mingle with and thicken the oil.

As will be seen by the illustrations, the cleaner is neat in appearance and takes up very little space. The standard traction type has an overall length of 20 in., width 6 in., and height 11 in., while the total weight is only 12 lb. The sectional drawing clearly illustrates the principle of the cleaner and also the simplicity of the design. There is nothing to get out of order, and as the cleaner cannot become clogged the amount of power used in its operation must always be the minimum and very much less than when screens are used.

Messrs. Watlington and Company, Limited, who have the sole European selling rights, supply the "Spencer" air cleaner in a variety of forms and for compressor capacity up to 7,000 cubic feet free air per minute. Several of the railways in America, both steam and electric, have adopted the cleaner to work in conjunction with the air brake compressors, and as these operate under the worst possible conditions, as to dust, it is gratifying to learn that they have been a complete success. In this country they have already been taken up by one of the London tube railways, some 60 cleaners being fitted to the air brake compressors.

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LIFTING JACKS FOR TRAMWAY CARS AND OMNIBUSES.

The Simplex Type.

Fortunately, in these days of efficient life-guards on tramway cars, the number of cases in which pedestrians get jammed underneath cars is relatively few. The possibility of such accidents happening is, however, always present, and sometimes when one has occurred there have been distressing scenes before a car could be lifted. On this ground, the policy of some tramway undertakings of having a lifting jack or jacks carried on each car is a highly commendable one. Nor does there seem any good reason why all motor omnibuses should not carry lifting jacks. They are much more dangerous vehicles than tramcars, and human ingenuity apparently has so far failed to devise an efficient and workable front life-guard for them. But even in regard to tramcars it is highly desirable that they should be equipped with jacks which can quickly lift the car and which are so constructed that it is impossible to drop the load accidentally. There has been recently introduced into England a jack of this character, called the "Simplex," in which safety, efficiency, simplicity, and economy are the basic principles. It is claimed to be a great improvement over the old Barrett type of ratchet jack, and its improved features are the result of several years' study of the problem.

The accompanying illustrations show the automatic locking device in this jack that makes it absolutely impossible to raise or lower the load without pumping the handle. This is brought about by a system of cam services, one on the under side of the lever socket, which wipes the lower or retaining pawl when the socket is in the up position, thereby locking the lower pawl, and the other on the top of the standard, which the lifting pawl wipes when the socket is in the down position, and locks the pawl in taking another tooth in the rack bar. If an obstruction, such as a metal chip, becomes caught in the tooth of the rack, interfering with the pawl fully entering the tooth, the jack is locked until this is remedied, thereby preventing the capacity load from resting on a small portion of the tooth. This is absolutely automatic, and therefore fool proof, and is one of the reasons the "Simplex" jack was awarded the gold medal for safety and general excellence of lifting jacks at the International Exhibition of Safety and Sanitation held in New York on December 20, 1913.

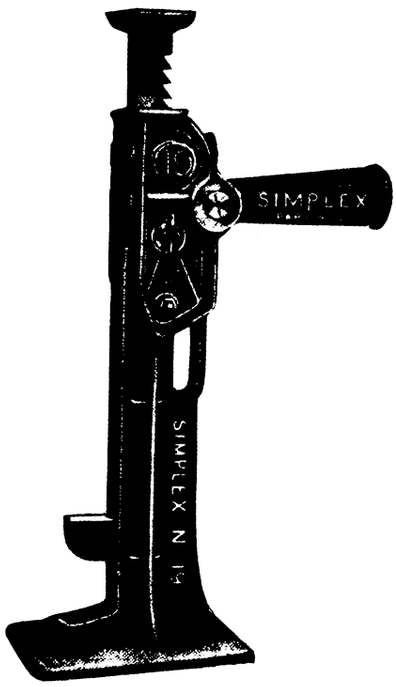
One of the great weaknesses of the old style ratchet jack was the spring used to actuate the pawls. A flat spring connecting the two pawls was used. The spring would often lose its tension or break, rendering the jack useless, with the possibility of dropping the load, and this has been the cause of many accidents. The defect has been remedied in the "Simplex" jack by a very ingenious device, a double acting coil spring, the action being reversed by an eccentric button. The coil spring is more efficient and has a longer life than the flat spring, but even if the "Simplex" pawl spring is broken the jack continues to work, because the springs are always in tension, even in the neutral position, and the only possibility of failure of the spring to work in case of breakage is that the broken parts would wind themselves together, which is highly improbable. In this case the automatic locking device prevents the load from dropping.

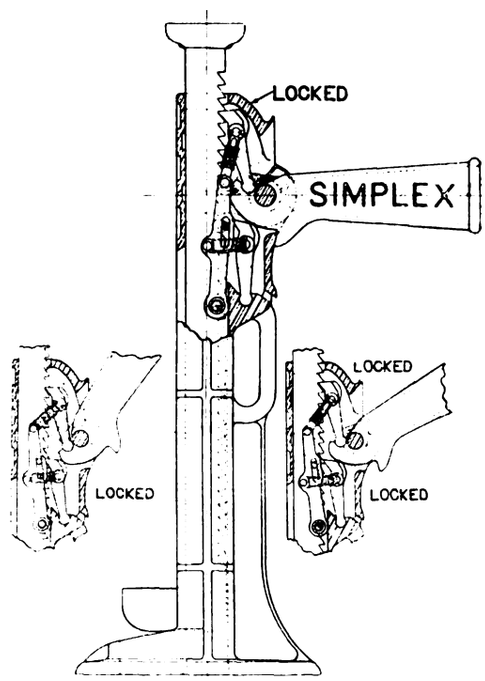
On the old style of jack there were used a malleable iron lever socket and a $\frac{3}{8}$ in. steel fulcrum pin working on malleable iron bushings. When the load was put on this jack the fulcrum pin would sometimes bend, pulling the lifting pawl away from the rack and rendering the jack useless. This has been overcome by the use of a high carbon steel cast lever socket, and two trunnions 1 in. in diameter cast integral with the lever socket, forming a fulcrum of greater bearing surface and strength. These trunnions work in tool-steel heat-treated cup bushings and assure positive lubrication and long life, also doing away with one part. The working end of the lever socket is heat-treated in the heavy capacity jacks and there are no rivets or bolts used to fasten the pawls in the socket.

The lifting power of this jack has been increased by placing the lifting pawl closer to the fulcrum pin. On the "Simplex" jacks this distance is $\frac{7}{8}$ in., as compared with 1 in. on the Barrett type. This distance, though it seems small, makes a vast difference in the lifting efficiency, and has been proved so by comparative tests. By the vertical lifting of the pawls on the "Simplex" jack, a great amount of friction between the parts of the standard and the rack bar has been eliminated.

Again, it should be noted that one of the conspicuous features is the small number of parts used in the construction. The old type of jack required over 30 parts in the construction, but in the assembly of this one only 11 distinct parts are used. This feature is a great advantage when one considers the cost of maintenance and of replacing parts.

In the construction of these parts the following materials are used: Standard, malleable iron heavily ribbed; rack bar, drop-forged special analysis steel with machine cut teeth; pawls, drop-forged special analysis steel, heat-treated; lever socket, special analysis cast steel; pawl springs, highest grade steel piano wire; all parts machined to jigs and gauges.





Simplex Type of Lifting Jack.

It will be interesting to mechanical men to test these jacks, and the Equipment and Engineering Company, of 2 and 3, Norfolk Street, Strand, London, offer to lend, without obligation, one or more pairs in order to prove that the "Simplex" jack has the excellent features claimed for it.

St. Petersburg Railways Electrification.—A message from St. Petersburg says that the Ministry of Ways of Communication is engaged on the question of the early carrying out of the projected electrification of the St. Petersburg group of north-western railways, and is desirous of taking advantage of the approaching constructional season, for, if this cannot be done, the realisation of this very important project in the interest of the St. Petersburg citizens may be delayed for a long time. The co-operation of the St. Petersburg Town Council is anticipated in the form not only of active assistance in promoting the present project but also in connecting the north-western group of electrified railways with the coming underground railway system.

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FINANCIAL REPORTS AND MEETINGS.

Scottish Motor Traction Company.—The directors recommend a dividend of 7½ per cent. (free of tax) for the year.

Melbourne Tramway and Omnibus Company.—A quarterly dividend of 6d. per share and a bonus of 6d. per share are announced.

Yorkshire (West Riding) Electric Tramways Company.—The directors announce a dividend at the rate of 5 per cent. per annum on the 6 per cent. preference shares, making 4 per cent. for the year.

Six Months' Increase of Traffic at Glasgow.—For the first half of the financial year the tramways traffic receipts amounted to £529,677, as compared with £492,054 in the corresponding period of the preceding year, an increase of £37,623. The number of passengers carried was 164,000,000, as compared with 150,000,000.

Bradford Half-Yearly Accounts.—The statement of accounts for the half-year ended September 30, presented to the Tramways Committee on December 1, showed a profit of £21,178, as compared with £25,997 for the corresponding period of last year. The traffic income was increased by £9,001, and represents 11·7d. per car-mile against 11·3d.

Manx Electric Railway.—The gross receipts for the year to September 30 amount to £40,160, and the gross expenditure to £18,740. Including £920 brought forward, there remains a total of £22,340. After deducting debenture interest amounting to £9,000, and the amount of the interim dividend of 2¾ per cent. on the preference shares, there remains £9,759. It is proposed to allocate to reserve, for special renewals, £2,000, and to pay a dividend of 2 per cent. on the ordinary shares, leaving £2,179 to be carried forward.

Isle of Thanet Tramways Company.—Mr. A. R. Monks, presiding at the annual meeting of the Isle of Thanet Electric Tramways and Lighting Company, in London, on December 8, said that the profit for the past year was £21,635 against £19,769 in the previous year. They were paying 3 per cent. on the preference shares, placing £2,000 to rolling stock reserves, and £6,000 to future maintenance of permanent way. In order to meet motor chars-a-banc competition, they hired two single-deck omnibuses and secured a profit of over £300.

Douglas Southern Electric Tramways.—The report states that the traffic receipts for the season were £6,492, against £5,204. The passengers carried were 265,763, against 212,528. The net profit is £2,435, against £1,733. The directors recommend the full dividend on the 7 per cent. non-cumulative preference and a dividend of 3¼ per cent. on the ordinary shares, absorbing £2,321, carrying forward £291. Mr. T. J. Hutchinson, who presided at the annual meeting, said the year had been a profitable one. The dividend on the ordinary shares was also higher than had ever been paid previously.

Buenos Aires Port Tramways Company.—Mr. George Kitchin, presiding at the annual general meeting of the Buenos Aires Port and City Tramways on December 15, stated that so far the returns for the current year, though showing an improvement on the latter part of 1912, could not be said to be satisfactory. It would not appear that the expenses had been reduced below an average of about 90 per cent. for the first eight months of the year. Two of their directors, Dr. M. Lacroze and Mr. John B. White, were leaving for Buenos Ayres on January 9 to examine the condition of the property and the best means of working it, and to consult with the local committee. When they met to consider the accounts for 1913—which, he hoped, they might do in June next—he anticipated being able to put a more satisfactory statement before them. A cable message received that morning showed an increase of traffic up to the end of November of £7,340. The working expenses for the last three months averaged 84·50 per cent.

New South Wales Railways and Tramways.—The report of the Chief Commissioner for Railways and Tramways for the quarter ended September 30 shows that there was an increase in the tramway earnings of £28,573, and an increase in expenditure of £40,898. Further particulars with reference to the tramways are appended:

Tramways.	Three Months September 30, 1913.	Three Months September 30, 1912.	Increase.	Dec.
Miles open	208¾	202	6¾	—
Revenue	£430,012	£401,439	£28,573	—
Expenditure	£386,880	£345,982	£40,898	—
Tram-miles run	7,912,716	6,441,986	570,730	—
Earnings per car-mile	1s. 2¼d.	1s. 3d.	—	¼d.
Expenditure per car-mile	1s. 1¼d.	1s. 1d.	¼d.	—
Percentage—expenditure to earnings	89·97	86·19	3·78	—
Number of passengers carried ...	72,592,137	58,331,877	4,260,260	—

Third-Party Insurance.—Allusion was made by a shareholder at the annual meeting of the Provincial Tramways Company to the setting aside of £2,000 for third-party insurance. Mr. J. Barber Glenn, the secretary, stated that this was the first time the company had set aside money for third-party insurance. It had been the practice of the company and also of the Isle of Thanet Tramways Company, with which he was connected, to insure in an office, and the payments were very considerable. In the Isle of Thanet Company at one time it was a very disastrous transaction for the insurance company; the Provincial Tramways had always been a very good risk. Accidents were always a very uncertain factor, and the last people that insured them at Gosport had not paid a single sixpence during the year until within a fortnight of the end of the 12 months, when a control wire got adrift and injured a woman, who recovered £550 damages and £170 costs. The directors had made a start towards insuring their own risks by setting aside £2,000. They were insured with an office up till next September, and possibly, when they had got the fund up to £4,000 or £5,000, they might safely do their own insurance altogether.

A Warning from Newcastle-on-Tyne.—Alderman J. H. Rodgers, presiding at a meeting of the Newcastle Corporation Tramways Committee, stated that during the last half-year the receipts had been £123,000, compared with £111,000 in the corresponding period of last year. The expenditure had increased by £11,000, and 2¾ million more passengers had been carried. Owing to the altered judgment in the Tottenham rating appeal, the committee had to pay back over £3,000 for rates which they had allowed last year under the judgment. The net surplus had decreased notwithstanding the very large increase of traffic. This was due to the increased cost of carrying on the department. The men had got more money, and there had been more men engaged to do the extra work. Now that the system was growing older the repairs were getting heavier, and coals were almost double the price. During the half-year they had spent out of the reserve fund £21,060 for relaying cables, alterations to cars, the relaying of the permanent way, and new machinery at the power-station, etc. This work would continue each half-year, and the possibility was that during the next six months there would be anything from £10,000 to £20,000 thus spent; and it would be necessary to build up that reserve fund again to the extent that they were depleting it. They could not go on granting concessions right and left.

Burma Electric Tramways and Lighting Company.—Mr. D. C. Ellis presided at the annual meeting of the Burma Electric Tramways and Lighting Company. He said that the past year's results were the best attained since the formation of the company, the earnings amounting to £7,575, against £3,748 in the previous year. This improved result was attributable to the increase in receipts from both traffic and light and power supply, and the saving in power and generating expenses due to the use of the Diesel engine in the place of the steam set. There had been placed to reserve for depreciation the sum of £5,000, against which account would be debited the cost of the second Diesel set, now on order. The balance of £2,575 added to the sum of £1,333 brought forward gives an available amount of £3,908, out of which it was proposed to pay a dividend of 3 per cent. on the preference shares, leaving £908 to be carried forward. In view of the opposition to the scheme of the board for dealing with the eight years' preference dividend arrears, they had decided to postpone the proposal to cancel them, in order that the earning capacity of the system might be more definitely ascertained. The manager and chief engineer, Mr. A. H. Burbridge, in commenting on the year's working, had pointed out that the improved result was to a great extent due to what he considered exceptional conditions, and warned the board not to anticipate a corresponding increase in the future. This warning was obviously given to prevent an exaggerated and unsafe estimate of the earning capacity of the undertaking being made. The report was adopted.

Blackpool Tramways Company's Chars-a-Banc Services.—It was stated by Mr. G. Nicholson, who presided at the annual meeting of the Blackpool, St. Anne's, and Lytham Tramways Company on December 15, that the directors intend to extend the motor chars-a-banc service as far as they possibly could, and additional powers would have to be obtained. The motor chars-a-bancs they had purchased cost £850, and the results of long-distance trips to Southport, the lakes, etc., were very satisfactory. The St. Anne's Council from the end of May reduced the cost of current to 1½d. per unit, a reduction of a farthing, and they had also granted concessions on the rent of the feeder cable and on the charge for arc lamps. The reduction altogether would amount to over £400 per annum. Owing to the fine weather the traffic receipts were £2,800 more than in the next best year. The cheap evening return tickets from Lytham and St. Anne's had been made good use of, and would be more popular still if the cars had covered tops, but owing to the company's financial condition they could not undertake this expenditure. The traffic expenses, costs, and the cost of current per car-mile continued to be the lowest in the country. They had spent £4,800 on repairs to the track, as against £3,272 in 1912, but they hoped that after the next two years this extraordinary expenditure would cease. The meeting adopted the directors' report, in which it was stated that the trustees for the debenture holders had intimated their intention of paying 2½ per cent. interest on account of arrears of interest due on the debenture stock. The net balance of revenue for the year was £5,056, and after the payment of £7,500 for debenture interest and £1,500 to the sinking fund, the balance carried down shows a debit of £34,103.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Year Ended.	Electric Traction Inaugurated.	System.	Line open (single track). Mls. Chs.	Borrowing Powers.	Borrowing Powers Exercised.	Unexhausted Borrowing Powers.	Total Capital Expenditure.	Capital Expenditure per Mile of Single Track.	Loans Outstanding.	Loans Repaid and Sinking Fund.	Depreciation, Renewal and Reserve Funds.	Gross Receipts. Traffic.	Other.	Total.
Aberdeen	May 31, 1913	Dec., 1899	E.	27 66	350,000	...	...	350,590	12,599	192,660	157,929	143,468	79,125	1,041	80,166
Accrington	Mar. 31, 1913	Aug., 1907	,,	10 53	169,675	134,670	35,800	134,525	12,619	116,976	17,694	13,200	27,419	403	27,822
Ashton-u-Lyne	Mar. 25, 1913	Aug., 1902	...	8 15	130,070	108,099	21,971	108,099	13,203	83,240	24,859	1,650	21,340	551	21,891
Ayr	May 15, 1913	Sept., 1901	,,	7 49	...	...	...	85,445	11,224	78,933	18,044	14,918	15,626	670	16,296
Birmingham	Mar. 31, 1913	Jan., 1904	,,	108 32	2,302,001	2,089,194	212,807	1,981,588	18,280	1,874,109	215,084	220,369	574,248	7,318	581,566
Blackburn	Mar. 25, 1913	Mar., 1899	,,	24 63	408,174	342,474	65,700	334,924	13,512	254,600	167,381	1,000	63,440	3,243	66,683
Blackpool	Mar. 31, 1913	June, 1899	,,	21 31	453,798	301,796	152,002	301,796	14,115	301,796	114,086	15,126	73,155	1,011	74,166
Bolton	Mar. 31, 1913	Dec., 1899	,,	47 17	552,208	551,019	1,189	551,107	11,842	338,439	162,580	55,901	135,149	1,313	136,462
Bradford	Mar. 31, 1913	July, 1898	,,	(b)103 69	1,269,568	982,398	287,170	1,002,566	9,653	607,928	388,335	89,072	280,758	18,345	299,103
Brighton	Mar. 31, 1913	Nov., 1901	,,	17 15	358,620	279,000	80,715	277,914	16,170	223,556	55,653	6,708	51,780	2,018	53,798
Burnley	Mar. 31, 1913	Dec., 1901	,,	22 13	388,052	339,125	48,927	231,601	10,450	179,498	56,652	48,212	79,641	249	79,890
Burton-on-Trent	Mar. 31, 1913	Aug., 1903	,,	9 60	108,632	104,562	4,070	106,225	10,895	50,583	53,979	8,966	14,383	1,304	15,687
Bury	Mar. 31, 1913	June, 1903	,,	21 14 (b)13 21	407,800	280,775	127,025	283,005	13,365	262,135	42,877	(l)24,571	67,370	284	67,654
Chester	Mar. 25, 1913	April, 1903	,,	6 35	92,991	82,380	10,611	82,934	12,883	69,727	12,785	2,968	12,272	458	12,730
Chesterfield	Mar. 31, 1913	Dec., 1904	,,	5 8	95,000	70,500	24,500	69,575	13,642	58,510	11,990	5,031	12,220	474	12,694
Colchester	Mar. 31, 1913	July, 1904	,,	7 75	70,748	69,555	1,193	69,401	8,743	53,425	17,049	Nil.	10,281	477	10,758
Croydon	Mar. 31, 1913	June, 1906	,,	19 10	287,689	287,689	Nil	284,847	14,894	230,968	87,264	42,453	90,543	1,921	92,464
Darlington	Mar. 31, 1913	June, 1904	,,	8 71	107,500	76,263	31,237	76,322	8,587	56,888	19,434	5,726	11,842	334	12,176
Darwen	Mar. 31, 1913	Oct., 1900	,,	7 13	93,400	86,300	7,100	86,300	12,048	57,330	28,280	7,450	14,244	1,176	15,420
Derby	Mar. 31, 1913	July, 1904	E.	22 5	...	...	...	242,785	11,004	157,213	85,572	(a)4,486	E 46,820	1,030	47,850
			H.		...	...	...	...	...	...	...	...	H 394	22	416
Doncaster	Mar. 31, 1913	June, 1902	E.	12 42	...	...	...	99,172	7,918	80,400	14,741	780	19,928	334	20,262
Dundee	May 15, 1913	July, 1900	,,	27 38	(f)	345,450	...	352,663	12,835	262,038	83,411	71,823	63,395	1,650	65,045
East Ham	Mar. 31, 1913	June, 1901	,,	14 32	190,643	190,242	401	191,583	13,307	148,515	58,075	5,097	57,050	610	57,660
Exeter	Mar. 31, 1913	April, 1905	,,	7 0	106,000	86,111	19,889	86,111	12,301	69,376	17,209	5,915	16,748	Nil	16,748
Gloucester	Mar 31, 1913	April, 1904	,,	15 0	191,000	144,243	46,757	147,692	9,846	111,051	16,816	750	16,177	1,168	17,345
Halifax	Mar. 31, 1913	June, 1898	,,	54 70	449,263	412,876	36,387	414,246	7,549	299,480	105,948	27,379	104,947	1,026	105,973
Ilford	Mar 31, 1913	Mar., 1903	,,	11 28	149,633	149,633	Nil	149,500	13,171	109,912	39,721	5,611	24,361	2,407	26,768
Ilkeston	Mar. 31, 1912	May, 1903	,,	4 24	64,214	47,000	15,074	47,936	11,148	42,600	11,919	350	6,533	156	6,689
Ipswich	Mar. 31, 1913	Nov., 1903	,,	14 70	116,471	114,300	2,171	114,838	7,720	98,858	16,305	8,180	22,575	829	23,404
Keighley	Mar. 31, 1913	Oct., 1904	,,	6 9	50,934	47,328	3,606	47,328	7,743	32,468	16,961	942	8,845	313	9,158
Kilmarnock	May 15, 1913	Dec., 1904	,,	5 47	65,000	52,625	12,375	53,191	9,519	44,766	7,379	4,017	8,543	248	8,791
Kirkcaldy	May 15, 1913	Feb., 1903	,,	8 45	213,000	96,748	116,252	96,749	11,025	80,333	16,415	4,161	15,712	494	16,206
Lancaster	Mar. 31, 1913	Jan., 1903	,,	4 65	60,000	51,550	8,450	43,432	9,022	36,200	13,838	3,000	5,437	143	5,580
Leith	May 15, 1913	Aug., 1905	,,	17 73	275,000	237,300	37,700	236,155	14,572	186,500	50,800	514	34,664	1,030	35,694
Leyton	Mar. 31, 1913	Dec., 1906	,,	18 40	306,427	306,371	56	295,376	15,966	249,165	48,876	3,445	68,809	1,558	70,367
Lincoln	Mar. 31, 1913	Nov., 1905	S.	2 77	98,519	44,947	53,572	44,992	15,187	42,893	9,862	(a) 1,600	6,717	128	6,845
Liverpool	Dec. 31, 1912	Nov., 1898	E.	119 0	...	...	...	2,015,193	16,934	1,245,282	1,012,873	430,509	631,071	13,103	644,174
Lowestoft	Sep. 30, 1912	July, 1903	,,	4 6	94,230	87,031	7,199	87,031	21,357	67,833	13,067	...	10,781	17	10,798
Maidstone	Mar. 31, 1913	July, 1904	,,	7 3	82,932	82,582	350	79,098	11,239	67,191	15,391	Nil.	9,761	535	10,296
Manchester	Mar. 31, 1913	June, 1901	,,	188 30	2,355,689	2,034,371	321,318	2,061,791	10,945	1,543,504	437,305	473,683	876,023	11,624	887,647
Nelson	Mar. 31, 1913	Feb., 1903	,,	3 69	38,000	37,832	168	37,832	9,795	30,118	7,714	...	10,240	51	10,291
Newport (Mon.)	Mar. 31, 1913	April, 1903	,,	14 28	219,250	196,250	23,000	193,191	13,463	164,763	31,487	9,035	37,555	995	38,550
Nottingham	Mar. 31, 1913	Jan., 1901	,,	37 40	730,300	725,945	4,355	638,005	17,479	426,818	217,041	64,242	161,746	2,404	167,160
Oldham	Mar. 25, 1913	May, 1902	,,	28 6 (b) 8 31	516,925	440,204	76,719	442,174	15,750	320,725	118,217	2,135	108,003	2,574	110,577
Perth	May 15, 1913	Nov., 1905	,,	6 60	90,000	78,350	11,650	78,629	11,649	63,340	15,489	1,673	8,761	509	9,270
Plymouth	Mar. 31, 1913	Sept., 1899	,,	15 0	...	189,512	...	219,417	14,628	90,925	37,826	17,550	37,925	1,123	39,048
Pontypridd	Mar. 31, 1912	Mar., 1905	,,	8 48	136,019	135,885	134	136,896	15,919	112,862	22,899	...	21,130	2,036	23,166
Rawtenstall	Mar. 31, 1913	May, 1909	,,	15 71	193,290	181,526	11,764	181,776	14,442	162,451	19,075	3,177	25,410	1,126	26,536
Rochdale	Mar. 31, 1913	May, 1902	,,	(i) 40 2	356,991	347,782	9,209	353,066	15,401	347,782	83,475	5,904	80,058	287	80,345
Rotherham	Mar. 31, 1913	Jan., 1903	,,	12 2	...	...	...	162,504	13,542	144,850	27,250	21,203	40,232	26	40,258
			R.T	...	...	...	...	...	...	...	...	...	2,457	Nil	2,457
Salford	Mar. 31, 1913	Oct., 1901	E.	75 64	1,050,666	723,669	326,997	723,672	9,599	536,791	258,977	45,699	260,365	486	260,851
Southampton	Mar. 31, 1913	Jan., 1900	,,	18 35	276,755	252,164	24,591	255,154	13,974	170,637	79,732	12,595	64,186	2,348	66,534
Southend-on-Sea	Mar. 31, 1913	July, 1901	,,	11 49	130,000	129,961	39	143,808	12,384	116,940	12,784	3,045	34,453	465	34,918
Southport	Mar. 31, 1913	July, 1900	,,	(d) 10 63	292,000	196,500	95,500	118,708	11,004	153,530	42,970	442	16,928	386	17,314
South Shields	Mar. 31, 1913	Mar., 1906	,,	10 21	251,883	174,936	76,947	172,476	16,806	150,228	30,818	20,833	33,654	498	34,152
Stalybridge, H., M., D.	Mar. 31, 1913	May, 1904	,,	27 57	325,270	274,990	44,280	279,778	10,096	224,700	56,290	500	34,961	677	35,638
Stockport	Mar. 31, 1912	Aug., 1902	,,	27 50	305,028	234,500	70,528	238,193	8,623	176,002	58,498	54,219	59,594	1,245	60,839
Sunderland	Mar. 31, 1913	Aug., 1900	,,	20 28	308,699	303,211	5,488	305,234	14,999	182,318	111,943	31,883	68,507	364	68,871
Wallasey	Mar. 31, 1913	Mar., 1902	,,	19 69	198,167	195,290	2,877	215,424	10,846	167,924	58,733	11,927	57,458	564	58,022
Walsall	Dec. 31, 1912	Dec., 1902	,,	19 44	188,145	188,100	45	183,351	9,378	156,161	31,939	30,879	30,629	800	31,429
Walthamstow	Mar. 31, 1913	June, 1905	,,	12 42	198,000	180,000	18,000	173,241	13,851	160,982	19,018	4,687	37,191	785	37,976
Warrington	Mar. 31, 1913	April, 1902	,,	9 52	103,674	102,896	778	102,128	10,583	73,830	29,068	10,000	22,903	302	23,205
West Ham	Mar. 31, 1913	Feb., 1904	,,	30 4	563,478	551,463	12,015	556,878	18,532	539,650	90,402	40,352	137,766	676	138,442
Wigan	Mar. 31, 1913	April, 1901	,,	(k) 34 42	...	...	...	...	...	...	...	...	71,268	1,515	72,783
Wolverhampton	Mar. 31, 1913	April, 1902	S.	21 40	279,733	265,616	14,117	278,615	12,959	217,882	47,734	50,220	53,963	797	54,760
Yarmouth (Gt.)	Mar. 31, 1913	June, 1902	E.	14 32	144,500	119,750	24,750	121,899	8,465	111,450	22,737	6,070	23,625	508	24,133

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast	Mar. 31, 1913	Nov., 1905	E.	98 54	1,567,674	1,386,232	181,442	1,389,713	14,037	1,381,200	144,342	117,769	250,589	3,788	254,377
Bexley	Mar. 31, 1912	Oct., 1903	,,	6 42	99,942	96,984	2,958	96,924	14,854	78,800	18,184	(g) 1,074	13,826	1,542	15,368
Birkenhead	Mar. 31, 1913	Feb., 1901	,,	24 7	375,848	364,854	10,994	366,610	15,220	247,012	117,863	18,070	61,202	4,365	65,567
Bournemouth	Mar. 31, 1913	July, 1902	,,	(e) 29 62	449,027	...	...	435,788	19,500	221,797	134,815	13,733	95,695	317	96,012
Cardiff	Mar. 31, 1913	May, 1902	,,	31 66	818,573	787,292	19,564	783,270	24,612	542,488	244,803	92,968	129,265	21,361	150,626
Coventry	Mar. 31, 1913	Jan., 1912	,,	15 40	220,538	216,436	4,102	211,298	13,632	216,436	3,287	2,876	38,996	157	39,153
Glasgow	May 31, 1913	Oct., 1898	,,	193 47 (b) 2 52	3,714,266	3,553,584	160,682	3,694,143	18,595	2,479,408	1,074,177	2,079,645	1,007,653	3,891	1,011,544
Huddersfield	Mar. 31, 1913	Feb., 1901	,,	46 0	646,284	407,142	239,142	417,408	9,074	255,177	161,349	19,132	106,586	3,123	109,709
Hull	Mar. 31, 1913	July, 1899	,,	30 44	677,673	541,871	135,802	542,371	17,753	527,641	147,925	125,407	157,048	1,393	158,441
Leeds	Mar. 31, 1913	Aug., 1897	,,	112 62	1,603,455	1,546,422	57,033	1,511,588	13,406	1,220,041	482,698	4,637	407,552	3,979	411,531
Leicester	Dec. 31, 1912	May, 1904	,,	37 0	739,210	719,223	20,017	722,021	19,514	607,476	129,211	100,000	134,966	12,705	147,671
London	Mar. 31, 1913	...	H.	15 70	(c)	(c)	(c)	...	...	...	...	...	37,544	879	38,423
		May, 1903	C.E	272 40				12,268,015	...	11,734,060	2,515,747	906,796	2,143,559	69,748	2,213,307
N'castle-on-Tyne	Mar. 31, 1913	Dec., 1901	E.	61 0	1,522,010	1,251,047	270,963	1,234,080	20,230	939,120	383,921	119,407	228,091	10,114	238,205
Northampton	Mar. 31, 1913	July, 1904	,,	9 13	239,800	127,255	112,545	135,481	14,786	91,176	36,078	10,499	27,250	899	28,149
Portsmouth	Mar. 31, 1913	Sep., 1901	,,	30 66	662,280	698,319	...	712,792	23,118	647,489	234,258	94,934	108,087	1,745	109,832
Preston	Mar. 31, 1913	June, 1904	,,	17 16	224,102	187,270	36,832	187,269	10,888	119,790	42,091	36,841	42,964	306	43,270
Reading	Mar. 31, 1913	July, 1903	,,	13 14	235,000	234,000	1,000	229,372	17,409	169,642	59,896	17,831	32,984	1,030	34,014
Sheffield	Mar. 25, 1913	Sep., 1899	,,	77 67	1,727,596	1,413,980	313,616	1,411,959	18,140	1,067,897	418,292	27,521	358,656	3,189	361,845
Wellington, N.Z.	Mar. 31, 1913	...	,,	30 7	496,423	496,423	Nil	606,771	20,165	496,423	39,486	109,066	149,446	826	150,272

C—Electric conduit system. E—Electric trolley system. H—Horse lines RT—Railless trolley system. S—Surface contact system.
(a) Accident insurance fund. (b) Additional lines leased and worked. (c) Conferred by Annual Money Act, which limits amount for each financial year. Powers not exercised are lapsed (d) Not including 8 m. 78 ch. leased lines. (e) Unlimited. (f) Includes 1¼ miles railless trolley route. (i) 17 mi. 8 chn. single track leased.
(j) Including £574 accident insurance fund. (k) Not including 10 miles 3 chains single track lines leased. (l) Including Insurance.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Working Expenses.					Gross Profit on Working.	Additions to Gross Profit.	Deductions from Gross Profit.					Net Surplus + or Deficit −
	Traffic.	General.	Repairs & Maintenance.	Power.	Total.			Interest.	Sinking Fund.	Income Tax.	Depreciation & Renewal.	Sundries.	Total.	
Aberdeen	20,710	9,404	5,954	7,138	43,206	36,960	472	6,839	4,661	...	13,407	...	24,907	+ 12,525
Accrington	6,839	1,870	2,102	4,644	15,455	12,367	...	4,000	3,693	127	...	...	7,820	+ 4,553
Ashton-under-Lyne	4,699	1,964	2,358	3,225	11,997	9,894	...	2,814	3,536	440	750	(i)1,004	8,544	+ 1,350
Ayr	3,486	1,964	1,604	1,989	9,043	7,253	...	1,972	1,943	122	2,041	...	6,078	+ 1,175
Birmingham	160,277	40,898	68,278	100,726	370,179	211,387	11,479	65,672	49,946	...	...	5,896	121,514	+101,352
Blackburn	14,863	4,262	12,392	10,999	42,516	24,167	110	5,292	14,909	206	...	...	20,407	+ 3,870
Blackpool	15,992	5,132	9,286	9,272	39,682	34,484	...	(h)9,184	6,969	...	8,000	...	24,153	+ 10,331
Bolton	29,821	8,646	15,984	19,767	74,213	62,244	1,114	(h)11,189	17,197	1,095	18,715	219	48,415	+ 14,943
Bradford	83,763	24,458	46,061	46,271	200,553	98,550	4,045	20,735	31,926	3,653	32,921	4,360	93,595	+ 9,000
Brighton	14,309	4,028	12,853	8,316	39,506	14,232	27	7,800	5,560	...	27	...	13,360	+ 932
Burnley	18,718	5,306	9,525	15,881	49,430	30,460	...	5,662	6,491	893	...	(f)2,873	15,919	+ 14,541
Burton-on-Trent	5,111	1,322	2,903	2,998	12,334	3,353	...	1,406	1,418	...	1,500	...	4,324	− 971
Bury	14,761	4,349	6,633	8,026	33,769	33,885	337	(h)7,974	4,824	244	...	(m)11,608	24,650	+ 9,572
Chester	3,349	1,574	878	2,203	8,004	4,726	93	(h)2,761	1,018	...	1,040	...	4,819	...
Chesterfield	2,739	1,230	1,912	2,110	7,991	4,703	253	2,287	1,849	...	...	...	4,136	+ 820
Colchester	2,825	1,189	1,771	2,508	8,293	2,465	48	(h) 2,159	2,319	...	...	...	4,478	− 1,965
Croydon	29,571	6,806	13,300	16,541	66,218	26,246	907	7,994	7,428	1,145	...	...	16,567	+ 10,586
Darlington	4,192	754	1,912	1,945	8,811	3,365	102	2,010	1,966	105	404	59	4,544	− 1,077
Darwen	3,594	831	3,096	2,395	9,916	5,504	141	2,298	2,191	...	1,050	...	5,539	+ 106
Derby	E 16,388 H 631	2,621	4,768 73	8,200 ...	31,977 704	15,873 def. 288	547	6,388	3,363	...	310	(l) 300	10,361	+ 6,059
Doncaster	4,364	1,156	4,698	3,561	13,779	6,483	84	2,876	1,737	...	664	...	5,277	+ 1,290
Dundee	16,477	5,607	7,122	10,216	39,422	25,623	...	8,606	6,020	233	9,254	...	24,113	+ 1,510
East Ham	17,280	6,330	11,722	10,072	45,404	12,256	...	(h) 5,806	6,725	...	...	454	12,985	− 729
Exeter	4,511	1,175	1,311	3,499	10,496	6,252	...	(h) 2,347	1,814	48	...	...	4,209	+ 2,043
Gloucester	6,891	1,687	3,250	1,914	13,782	3,563	...	(h)4,502	2,772	...	750	...	8,024	− 4,461
Halifax	27,116	8,306	15,263	18,976	69,661	36,312	51	10,159	10,562	...	6,701	1,760	29,182	+ 7,181
Ilford	9,482	2,424	4,116	4,279	20,301	6,467	557	4,894	4,146	...	...	...	9,040	− 2,016
Ilkeston	2,359	579	1,613	1,476	6,027	662	157	1,578	1,644	...	...	210	3,432	− 2,613
Ipswich	8,072	1,827	4,015	3,502	17,416	5,988	...	(h) 3,642	2,078	...	...	...	5,720	+ 268
Keighley	2,692	768	899	1,612	5,971	3,187	179	1,116	1,881	...	...	(m) 369	3,366	...
Kilmarnock	2,921	599	800	1,633	5,953	2,838	...	(h)1,623	1,233	3	1,160	28	4,047	− 1,209
Kirkcaldy	4,728	1,158	1,525	2,636	10,047	6,159	...	2,660	1,608	...	410	110	4,788	+ 1,370
Lancaster	2,237	474	872	1,621	5,204	376	80	1,243	1,467	...	...	...	2,710	− 2,254
Leith	9,204	2,631	4,213	3,468	19,516	16,178	272	(h)6,343	7,750	15	...	70	14,176	+ 2,274
Leyton	(p)21,929	6,544	11,592	12,875	52,940	17,427	133	10,048	8,064	...	...	228	18,340	− 780
Lincoln	1,478	625	989	925	4,017	2,828	153	1,529	1,071	...	...	...	2,600	+ 381
Liverpool	167,045	58,771	80,184	113,893	419,893	224,281	24,015	50,096	59,155	...	(d)66,929	e) 5,217	181,397	+ 66,929
Lowestoft	3,285	796	2,115	2,813	9,009	1,789	..	(h) 2,261	1,562	...	...	350	4,173	− 2,384
Maidstone	2,405	1,018	1,469	1,903	6,795	3,501	58	2,687	2,243	...	...	32	4,962	− 1,403
Manchester	255,604	83,574	84,879	133,681	557,738	329,909	14,282	55,771	52,394	8,613	96,351	(e 31,062	244,191	+100,000
Nelson	2,425	677	1,320	2,006	6,428	3,863	...	1,008	966	...	...	...	1,974	+ 1,899
Newport (Mon.)	10,254	4,009	10,364	7,044	31,671	6,879	808	5,817	4,197	...	...	...	10,014	− 2,327
Nottingham	43,601	15,142	18,684	30,847	108,274	58,886	...	14,349	19,762	...	...	...	34,111	+ 24,775
Oldham	25,759	7,792	18,416	21,470	73,437	37,140	1,474	15,796	11,822	1,099	...	(g) 7,762	36,479	+ 2,135
Perth	3,182	698	418	1,252	5,550	3,720	50	1,523	1,632	3	612	...	3,770	...
Plymouth	8,031	4,161	4,322	7,905	24,419	14,629	1,257	4,793	3,932	...	4,465	...	13,190	+ 2,636
Pontypridd	5,307	1,469	6,611	3,656	17,043	6,123	5	(h)4,293	4,034	...	590	41	8,958	− 2,830
Rawtenstall	5,415	2,133	3,445	4,113	15,106	11,430	(q) 1,612	5,947	6,113	...	...	...	12,060	+ 982
Rochdale	18,354	4,363	8,535	10,746	41,998	38,347	7,594	11,454	9,594	700	1,382	(z)9,483	32,613	+ 13,328
Rotherham	E 9,212 RT 557	2,778 273	5,711 633	8,591 369	26,292 1,832	13,966 625	...	4,918 73	3,261 ...	...	5,037 ...	...	13,216 73	+ 750 + 552
Salford	73,745	17,785	22,183	47,371	161,084	99,767	5,659	18,749	21,887	2,522	12,867	(k)27,401	83,426	+ 22,000
Southampton	19,408	5,269	10,092	12,280	47,049	19,485	9,151	7,290	7,241	565	5,000	1,422	21,518	+ 7,118
Southend-on-Sea	8,046	2,260	3,534	6,187	20,027	14,891	4,228	(h) 3,834	1,753	...	4,017	...	9,605	+ 9,514
Southport	4,428	2,140	2,662	3,263	12,493	4,821	6,362	6,513	5,017	...	1,977	628	14,135	− 2,952
South Shields	7,929	3,263	2,659	5,370	19,221	14,931	313	(h)5,488	3,438	...	...	...	8,926	+ 6,318
Staly'dge,H.,M.,D.	12,148	4,018	6,273	6,445	28,884	6,754	...	(h) 7,711	7,308	...	327	532	15,878	− 9,124
Stockport	12,436	3,717	6,437	4,781	27,371	33,468	1,326	5,978	8,365	910	6,795	3,208	25,254	+ 9,540
Sunderland	18,431	4,552	4,670	11,268	38,921	29,950	252	(h) 7,228	10,366	476	7,132	...	25,202	+ 5,000
Wallasey	17,249	4,326	5,695	10,660	37,930	20,092	316	5,522	4,559	...	634	...	10,715	+ 9,693
Walsall	7,155	3,034	4,126	3,913	18,228	13,201	1,334	5,164	3,577	415	368	1,119	10,643	+ 3,892
Walthamstow	14,731	2,646	6,717	8,175	32,269	5,707	210	(h) 6,035	2,698	...	...	...	8,783	− 2,866
Warrington	5,529	1,779	4,255	3,235	14,798	8,407	408	2,580	3,254	...	...	...	5,834	+ 2,981
West Ham	51,254	11,253	26,921	19,386	108,814	29,628	508	19,511	12,369	685	...	959	33,524	— 3,388
Wigan	...	...	...	...	41,318	31,465	...	13,859	12,391	...	...	3,781	...	...
Wolverhampton	12,259	4,157	7,334	6,778	30,528	24,232	(x) 1,131	7,788	5,146	100	4,915	(a)3,637	21,586	+ 3,777
Yarmouth (Gt.)	7,443	1,867	2,634	4,388	16,332	7,801	95	(h) 4,094	2,740	...	...	...	6,834	+ 1,062

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast	73,836	13,642	32,519	23,887	143,884	110,492	1,363	45,900	24,541	2,023	13,000	1,628	87,092	+ 24,763
Bexley	(s) 5,465	984	1,892	920	9,261	6,107	...	2,942	2,325	...	500	...	5,767	+ 340
Birkenhead	16,099	4,011	10,380	9,371	39,861	25,706	86	(h)11,537	9,501	269	4,302	183	25,792	...
Bournemouth	22,307	6,912	9,107	13,967	52,293	43,719	723	10,733	15,371	...	...	(r) 8,017	34,121	+ 10,321
Cardiff	37,582	(c)11,176	15,351	20,184	84,293	66,333	1,732	24,138	22,801	800	6,946	...	54,685	+ 13,380
Coventry	10,112	4,289	6,952	2,765	24,118	15,035	2,950	10,379	6,163	...	1,258	...	17,800	+ 185
Glasgow	305,400	122,812	142,988	48,147	619,347	392,197	58,631	81,774	97,077	13,388	215,757	9,829	417,825	+ 33,003
Huddersfield	26,892	6,064	22,638	9,933	65,527	44,182	61	(h)11,749	10,904	1,630	...	...	24,283	+ 19,960
Hull	47,495	12,212	42,005	11,245	112,957	45,484	1,500	16,730	12,201	1,500	(u)3,118	...	33,549	+ 13,435
Leeds	109,413	36,055	39,894	28,455	213,817	197,714	7,511	42,197	49,923	5,021	41,752	4,957	143,850	+ 61,375
Leicester	47,876	9,447	22,023	15,633	95,029	52,642	2,512	23,252	12,095	1,939	7,668	...	44,954	+ 10,000
London	H 19,064 E 742,157	4,670 (r) 185,634	6,592 312,395	(m)22,122 220,042	52,448 1,460,228	def.14,025 753,079	... † 33,397 †	342,645	388,042	28,188	497	(l)27,104	786,476	...
N'castle-on-Tyne	64,493	18,675	25,944	19,908	129,020	103,185	3,966	30,431	39,556	3,179	...	6,796	79,962	+ 33,189
Northampton	7,254	3,080	2,489	3,563	16,386	11,763	279	3,481	4,312	323	...	(b)1,226	9,342	+ 2,700
Portsmouth	28,918	10,200	7,877	5,231	52,226	57,606	8,831	20,875	17,462	964	8,412	350	48,063	+ 18,374
Preston	10,781	4,592	6,263	2,429	24,065	19,205	...	3,933	4,891	..	3,649	1,358	13,831	+ 5,374
Reading	8,837	3,702	3,648	3,358	19,545	14,469	...	6,714	4,662	291	...	...	11,667	+ 2,802
Sheffield	113,235	22,312	43,656	28,487	207,690	154,155	3,057	35,616	40,663	3,786	30,187	213	110,465	+ 46,748
Wellington, N.Z.	56,296	7,242	21,330	16,260	101,128	49,144	2,664	19,961	4,778	...	14,068	4,702	43,509	+ 8,299

(a) Includes £4,393 loss on motor omnibuses. (b) Includes £500 loss on omnibus account. (c) Includes £1,611 insurance fund. (d) Includes reserve.
(e) Includes rents for leased lines. (f) £2,061 rent of leased lines. (g) Includes rents of lines and deficit 1912. (h) Including income tax.
(k) Includes rents of lines. (l) Including loss on horse traction. (m) Horsing expenses. (n) Transferred to motor omnibus capital account.
(p) Includes £396 horse account. (q) Aid from rates £1,500. (r) Including special charges, £5,911. (s) Including £2,128 through-running expenses.
(u) District fund widening streets. (w) Amount apportioned to leased lines. (x) Includes £306 profit on motor char-a-banc.
(z) Includes £6,469 rent of leased lines. † This item includes £734 payable to Sinking Fund of Hurst U.D.C.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Appropriation of Net Surplus.			Receipts per Car Mile.		Operating Expenses per Car Mile.					Percentage of Operating Expenses to Total Revenue.	Average Operating Expenses per Car Mile (excludi'g Power Cost).	Board of Trade Units.		
	Carried Forward.	Reserve.	Contribution to Rates or Municip'l Funds.	Average Total per Car Mile.	Average Traffic per Car Mile.	Traffic.	General.	Repairs and Maintenance.	Power. (Price paid)	Total.			Units.	Cost per Unit.	Units used per car mile.
				d.	d.	d.	d.	d.	d.	d.	%	d.		d.	
Aberdeen ...	...	12,525	...	11·06	10·92	2·859	1·298	·822	·985	5·964	53·89	4·979	2,110,964	·81	1·21
Accrington ...	460	3,359	724	12·57	12·38	3·09	·84	·95	2·10	6·98	55·55	4·88	907,721	1·24	1·70
Ashton-u-Lyne	...	...	1,350	11·475	11·186	2·463	·899	1·236	1·691	6·289	54·801	4·598	619,289	1·25	1·353
Ayr...	...	1,175	...	10·13	9·713	2·16	1·23	·99	1·24	5·62	55	4·35	378,570	1·26	·98
Birmingham ...	...	45,000	56,352	10·62	10·492	2·929	·747	1·248	1·840	6·764	63·6	4·924	21,594,889	1·119	1·64
Blackburn ...	3,870	...	...	14·02	13·34	3·12	·90	2·61	2·31	8·94	56·84	6·63	2,030,535	1·3	1·81
Blackpool ...	...	2,667	7,664	16·93	16·71	3·64	1·17	2·12	2·12	9·03	53·50	6·95	1,400,209	1·587	1·33
Bolton	443	...	14,500	11·558	11·447	2·525	·733	1·354	1·674	6·286	54·915	4·612	4,315,448	1·1	1·52
Bradford	...	...	9,000	12·021	11·314	3·366	·983	1·859	1·860	8·068	67·051	5·687	11,126,989	1	1·863
Brighton	932	...	...	11·545	11·112	3·071	·864	2·758	1·785	8·478	73·43	6·693	1,663,126	1·2	1·49
Burnley	...	5,791	8,750	13·226	13·185	3·098	·878	1·577	2·630	8·183	61·85	5·55	3,079,155	1·214	2·11
Burton-on-Trent	...	...	...	8·61	7·90	2·81	·73	1·45	1·42	6·41	78·7	4·99	515,622	1·39	1·01
Bury	...	(i) 4,572	5,000	10·22	10·04	2·214	·685	1·152	1·290	5·341	49·91	4·051	2,039,011	1·081	1·271
Chester	...	...	...	8·81	8·80	2·32	1·09	·61	1·52	5·54	63	4·02	385,132	1·33	1·11
Chesterfield ...	...	820	...	10·51	10·12	2·27	1·02	1·58	1·75	6·62	62·9	4·87	405,096	1·25	1·39
Colchester ...	...	...	...	7·98	7·627	2·096	·882	1·313	1·86	6·151	76·74	4·291	401,208	1·5	1·24
Croydon	...	7,586	3,000	8·381	8·207	2·763	·637	1·224	1·499	6·123	70·91	4·497	2,484,993	1·604	·938
Darlington ...	...	...	...	7·651	7·441	2·633	·480	1·202	1·222	5·537	72·36	4·315	466,784	1	1·222
Darwen	106	...	...	14·218	14·204	3·771	·783	2·833	2·396	9·783	64·30	7·387	...	...	...
Derby	6,059	...	...	E 9·884	9·671	3·385	·541	·985	1·694	6·605	66·8	4·911	1,357,232	1·45	1·168
				H. 5·649	5·347	8·564	...	·994	...	9·558	169·4	...	...	...	...
Doncaster ...	...	1,290	...	9·41	9·25	2·03	·54	2·18	1·65	6·40	69·1	4·75	683,651	1·25	1·33
Dundee	...	10	1,500	11·480	11·189	2·908	·989	1·257	1·803	6·957	60·6	5·154	2,451,897	1	1·803
East Ham ...	...	...	...	10·06	9·95	3·02	1·10	2·04	1·76	7·92	78·8	6·16	2,139,401	1·125	1·55
Exeter	...	2,043	...	9·272	9·272	2·498	·650	·726	1·937	5·811	62·67	3·874	516,793	1·625	1·192
Gloucester ...	...	...	...	6·618	6·173	2·630	·644	1·255	·730	5·259	79	4·529	480,442	1	·73
Halifax	...	...	7,181	11·816	11·702	3·023	·926	1·702	2·116	7·767	65	5·65	3,900,902	1·125	1·81
Ilford	...	...	...	7·616	7·464	2·698	·689	1·171	1·218	5·776	76·4	4·558	960,866	1·07	1·098
Ilkeston	...	...	...	6·73	6·57	2·36	·58	1·63	1·49	6·06	90·25	4·57	339,920	1·042	1·4
Ipswich	268	...	...	8·408	8·110	2·900	·657	1·442	1·258	6·257	74·41	4·999	672,411	1·25	1·007
Keighley	...	...	...	9·064	8·754	2·664	·761	·890	1·595	5·910	65	4·315	254,636	1·5	1·05
Kilmarnock ...	...	...	...	7·09	6·89	2·357	·482	·646	1·317	4·802	66·3	3·487	313,550	1·25	1·06
Kirkcaldy ...	1,370	...	...	8·22	7·97	2·398	·587	·774	1·337	5·096	63·95	3·75	632,581	1	1·337
Lancaster ...	...	...	...	7·92	7·61	3·130	·664	1·221	2·269	7·284	91	5·015	228,902	1·7	1·33
Leith	2,274	...	...	9·07	8·81	2·34	·67	1·07	·88	4·96	54·67	4·08	899,191	·92	·95
Leyton	...	...	...	9·368	9·161	(c) 2·920	·671	1·543	1·714	7·048	75·092	5·374	2,911,345	1·037	1·615
Lincoln	381	...	...	10·24	10·05	2·21	·94	1·47	1·38	6·00	58·7	4·62	183,807	1·25	1·107
Liverpool ...	...	...	66,929	12·03	12·28	3·184	1·120	1·529	2·171	8·004	63·6	5·833	...	...	...
Lowestoft ...	...	...	...	8·3	8·3	2·5	·6	1·6	2·18	6·9	83·40	4·8	385,731	1·75	1·2
Maidstone ...	...	...	...	8·36	7·93	1·96	·82	1·19	1·55	5·52	69·58	3·97	365,309	1·25	1·236
Manchester ...	...	...	100,000	11·351	11·202	3·269	1·069	1·085	1·709	7·132	62·83	5·423	30,492,127	1·046	1·625
Nelson	1,889	...	...	12·29	12·23	2·89	·81	1·58	2·39	7·67	62	5·28	240,804	2	1·2
Newport (Mon.)...	...	...	...	9·557	9·310	2·542	·994	1·570	1·746	7·852	82·26	6·106	1,239,245	1·28	1·28
Nottingham ...	...	5,775	19,000	11·50	11·34	3·00	1·05	1·29	2·11	7·45	64·19	5·39	5,761,096	1·25	1·65
Oldham	...	2,135	...	12·946	12·645	3·016	·912	2·156	2·514	8·598	66·41	6·084	3,435,211	1·49	1·675
Perth	...	...	...	8·79	8·31	3·02	·66	·39	1·19	5·26	59	4·07	277,474	1·08	1·09
Plymouth ...	...	...	2,696	11·790	11·094	2·349	1·217	1·264	2·312	7·142	62·53	4·830	1,139,761	1·667	1·38
Pontypridd ...	...	...	...	10·92	10·78	2·71	·75	3·37	1·87	8·70	80·65	6·83	701,941	1·25	1·49
Rawtenstall ...	...	982	...	11·49	11·01	2·35	·92	1·49	1·78	6·54	56·69	4·76	734,781	1·38	1·33
Rochdale... ...	7,423	5,904	...	11·019	10·980	2·524	·610	1·193	1·560	5·867	52·3	4·327	2,566,554	1·005	1·553
Rotherham ...	E. ...	...	750	12·50	12·50	2·86	·86	1·77	2·67	8·16	65·31	5·49	1,499,517	1·375	1·94
	R.T 552	...	...	10·36	10·36	2·35	1·15	2·66	1·56	7·72	74·56	6·16	64,520	1·375	1·13
Salford	...	...	22,000	10·692	10·673	3·023	·729	·909	1·942	6·603	62	4·661	9,260,898	1·227	1·600
Southampton ...	7,118	...	...	10·411	10·044	3·037	·825	1·579	1·921	7·362	71	5·441	2,000,301	1·5	1·31
Southend-on-Sea	2,514	1,000	6,000	13·14	12·97	3·03	·85	1·33	2·33	7·54	57·35	5·21	848,538	1·75	1·33
Southport ...	...	...	...	9·595	9·381	2·454	1·186	1·475	1·808	6·923	72·1	5·101	513,285	1·5	1·185
South Shields ...	(d) 500	4,218	1,600	10·066	9·919	2·253	·885	·729	1·566	5·433	56·28	4·077	914,188	1·407	1·122
Stalybridge, &c.	...	...	...	7·880	7·729	2·686	·887	1·387	1·425	6·385	81·33	4·960	1,719,696	·9	1·584
Stockport ...	...	540	9,000	10·434	10·221	2·133	·638	1·103	·820	4·694	44·99	3·874	1,704,943	1·03o	1·218
Sunderland ...	...	...	5,000	11·208	11·149	2·999	·741	·760	1·834	6·334	55·81	4·50	1,764,971	1·5	1·19
Wallasey ...	...	2,500	7,500	11·035	10·928	3·280	·823	1·083	2·028	7·214	65·3	5·18	1,827,115	1·4	1·45
Walsall	3,392	...	500	11·326	11·038	2·578	1·094	1·487	1·410	6·569	58	5·159	780,825	1·25	1·172
Walthamstow ...	...	...	...	7·92	7·76	3·07	·55	1·40	1·71	6·73	84·97	5·02	1,426,964	1·375	1·24
Warrington ...	1,481	...	1,500	12·398	12·237	2·954	·950	2·275	1·728	7·908	64 611	6·177	517,587	1·50	1·152
West Ham ...	...	...	...	9·43	9·329	3·554	·761	1·823	1·313	7·451	78	6·038	6,103,884	·75	1·72
Wigan	...	...	...	12·05	11·80	...	...	...	...	6·81	58·77	5·00	2,132,384	...	1·471
Wolverhampton ...	...	...	3,777	11·250	11·086	2·518	·854	1·507	1·393	6·272	55·75	4·879	1,620,970	1	1·388
Yarmouth (Gt.)...	1,062	...	...	8·605	8·425	2·655	·666	·938	1·564	5·823	67·95	4·259	655,315	1·60	·974

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

														Works Cost.	
Belfast	...	...	24,763	10·27	10·12	2·98	·55	1·31	·96 *	5·80	56·33	4·83	9,733,420	·589	1·40
Bexley	40	...	...	12·8	12·63	3·04	·89	1·75	·87	6·55	60·3	5·68	350,103	·63	1·37
Birkenhead ...	...	...	...	12·075	11·89	3·128	·779	2·016	1·141	7·064	58·49	5·923	2,490,713	·565	2 016
Bournemouth ...	...	10,321	...	12·24	12·20	2·85	·88	1·16	(b) 1·78	6·67	54·46	4·89	2,917,309	·583	1 55
Cardiff	3,980	...	9,400	12·014	11·83	3·449	1 026	1·409	·679	6·563	56	5·884	4,015,405	·438	1 54
Coventry ...	185	...	...	9·451	9·414	2·441	1·035	1·678	·668	5·822	61·6	5·154	1,533,212	·450	1·44
Glasgow	...	...	33,003	10·404	10·364	3·141	1·263	1·471	·495	6·370	57·88	5 875	32,280,346	·358	1 38
Huddersfield ...	...	13,370	6,590	11·04	10·73	2·70	·61	2·28	1·00	6·59	59·73	5·59	5,415,488	·42	2·27
Hull	...	1,435	12,000	9·42	9·33	2·82	·68	2·46	·67	6·63	71·04	5·96	4,855,082	·67	1·31
Leeds	...	...	61,375	11·229	11·120	2·985	·984	1·089	·776	5·834	51·95	5·058	16,461,894	·440	1 807
Leicester ...	...	...	10,000	9·675	8·843	3·137	·622	1·443	1·024	6·226	64	5·202	6,558,800	·3645	1·79
London	...	...	...	H. 8·75	8·53	4·32	1·07	1·50	5·02	11·91	136·50	11·91	...	...	...
				E. 10·04	9·73	3·36	·84	1·42	1·00	6·62	65·97	5·62	138,714,732	·619	2·62
N'castle-on-Tyne	...	21,189	12,000	11·958	11·451	3·238	·937	1·302	1·000	6·477	52·57	5·477	9,426,563	·394	1·972
Northampton ...	500	1,200	1,000	10·55	10·21	2·72	1·15	·93	1·34	6·14	58	4·80	934,909	·91	1·46
Portsmouth ...	11,374	(f) 3,000	4,000	12·229	12·035	3·220	1·136	·877	·582	5·815	47·55	5·233	2,599,210	·543	1·206
Preston	...	5,374	...	10·698	10·50	2·665	1·135	1·550	·600	5·95	55·63	5·35	1,516,545	·384	1·309
Reading	...	2,802	...	8·920	8·650	2·319	·970	·957	·880	5·126	57	4·246	1,033,313	·78	·99
Sheffield	...	7,032	37,716	10·760	10·665	3·367	·664	1·298	·847	6·176	57·389	5·329	16,500,208	·673	1·837
Wellington, N.Z.	8,299	...	...	15·654	15·568	5·864	·755	2·222	1·694	10·535	67·3	8·841	4,921,466	·80	2·13

* The figures given under "Power" in Table II. include actual works costs only. H—Horse lines. E—Electric trolley system. (b) Including ·58d. per car mile current supplied by Bournemouth and Poole Supply Company. (c) Horse account ·053d. (d) Accident, insurance, and compensation fund. (f) Insurance fund. (i) Including insurance.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Population Served.	Traffic Records. Car Mileage.	Passengers Carried.	Passengers Carried per Car Mile.	Average Fare per Passenger.	Average Journeys per Head of Populat'n per Annum.	Average Car Miles per Day per Car.	Traffic Revenue per Mile of Single Track.	Average Traffic Revenue per Annum per Head of Populat'n Served.	Operating Expenses per Passenger.	Average Distance of 1d. Fare.	Average Fare Charged per Mile.	Average Speed per Hour.	Average Total Car Hours per Day.	Average Number of Cars in Use Daily.	Number of Cars in Stock.
					d			£		*d.*	*Miles.*	*d.*	*Miles.*			
Aberdeen	165,000	1,738,966	19,990,711	11·49	·95	121·15	105·8	2,930	9/6	·519	1·69	·6	7·5	655	45	77
Accrington	70,000	531,356	4,577,019	8·6	1·43	65·3	105	2,572	7/10	·81	1·07	·929	7·5	242	17	27
Ashton-u-L.	50,000	487,856	4,754,139	10·383	1·077	95·083	104	2,606	8/6	·606	1·223	·81	8	204	12	21
Ayr	33,000	385,986	3,880,850	10·05	·96	117	106	2,079	9/6	·558	1·26	·75	8	140	10	20
Birmingham	*est.*850,000	13,134,642	134,467,166	10·23	1·025	158	81·06	5,298	13/6	·66	2·34	·366	7·5	5,063	485	511
Blackburn	200,000	1,141,161	11,721,367	10·88	1·27	58·61	105	2,564	6/4	·87	1·25	·76	7·50	434	31	61
Blackpool	67,500	1,050,115	12,452,820	12	1·41	184·48	89·6	4,321	21/8	·765	...	...	8	...	32	72
Bolton	221,000	2,831,003	30,287,673	10·69	1·065	137·04	121·66	2,875	12/3	·588	1·468	·627	7·25	1,030	60	106
Bradford	354,000	5,971,561	62,005,976	10·383	1·086	175	113	2,703	15/11	·776	1·63	·504	7·3	2,232	144	242
Brighton	132,265	1,118,309	11,312,855	10	1·09	85·55	82·83	3,012	7/11	·84	1·27	·788	6·41	544	34	50
Burnley	175,000	1,449,647	15,949,359	11	1·18	91	95	3,620	9/1	·744	1·25	·83	7	760	40	57
Burton	48,000	437,106	3,188,655	7·30	1·082	66	...	1,684	5/10	·928	1·505	·58	7·5	...	...	20
Bury	128,202	1,599,872	15,132,553	9	1·07	118·03	102·33	1,957	10/6	·535	1·24	·85	8·56	506·64	42·71	54
Chester	39,028	346,645	3,067,815	8·85	·96	78·6	95	1,906	6/4	·626	1·27	·8	7	150·60	10·04	18
Chesterfield	38,000	289,745	2,631,398	9·08	1·1	69	122	2,407	6/8	·728	1·38	·75	7·33	126	7	14
Colchester	44,160	323,524	1,871,896	5·79	1·32	42·39	89·3	1,295	4/8	1·06	·85	1·09	6·81	157·92	9·87	18
Croydon	170,451	2,657,824	20,504,143	7·74	1·06	120·29	125	4,734	10/7	·775	2·15	·50	7·92	915·82	58	75
Darlington	58,000	381,920	3,791,835	9·9	·75	65·38	95·1	1,345	4/1	·557	1·219	·45	6·66	151·25	11	16
Darwen	40,611	252,710	2,755,011	10·91	1·24	67·83	...	1,989	7/-	·864	...	...	...	...	...	...
Derby	124,000	E 1,161,854	10,857,834	9·345	1·035	87·56	...	2,122	7/7	·707	1·44	·75	6·375	...	...	50
		H. 17,674	98,230	5·558	·962			...	...	1·36	1	1	...	...	...	3
Doncaster	52,000	516,540	5,072,172	9·81	·962	97·54	103	1,591	7/8	·652	1·26	·76	7·5	218	16	25
Dundee	165,000	1,359,821	17,734,162	13·04	·857	107	...	2,305	7/8	·533	2	·50	7·3	...	...	68
East Ham	130,000	1,375,433	17,775,698	12·92	·77	132	...	5,101	8/9	·61	1·80	·65	...	...	...	45
Exeter	48,660	433,507	4,110,513	9·48	·98	84·48	...	2,392	6/11	·612	1	1	6	...	16	20
Gloucester	53,972	628,946	4,200,432	6·7	·92	77	90·75	1,078	6/-	·78	1·5	·65	6·78	260·3	19	30
Halifax	176,000	2,152,391	19,456,923	9·04	1·27	110	79·5	1,912	11/11	·86	1·35	·84	6·8	814	74	95
Ilford	82,000	843,517	7,578,813	8·79	·831	92·42	...	2,312	5/1	·64	1·843	·69	8	...	...	26
Ilkeston	32,000	238,645	1,732,846	7·25	·9	54	117	1,713	6/1	·836	3·2	·35	7·5	108	7·5	13
Ipswich	75,300	668,025	5,554,585	8·31	·975	73·76	65·5	1,518	6/-	·75	1·53	·693	6·17	234·19	20·78	36
Keighley	43,000	242,500	3,099,272	12·8	·68	72·08	55·35	1,447	4/1	·462	2·22	·45	6·87	126	7	12
Kilmarnock	36,000	297,557	2,317,709	7·78	·879	64·38	90·05	1,537	4/8	·616	1·13	·86	7·22	112·58	9·05	14
Kirkcaldy	39,600	473,089	5,237,947	11·07	·719	132·27	59	1,786	7/11	·46	1·822	·64	7·5	195	15	22
Lancaster	41,414	171,475	1,461,104	8·52	·893	35	75	1,132	2/8	·854	1·71	·5	8	88·2	6·3	12
Leith	110,400	944,329	9,706,611	10·28	·87	87·92	125	1,926	6/3	·482	1·32	·72	8·3	311	20·66	37
Leyton	124,735	1,802,647	17,476,453	9·69	·945	140	112	3,719	11/-	·727	...	...	8	...	...	60
Lincoln	20,000	160,446	1,733,259	10·8	·92	86·66	64·08	2,264	6/8	·556	1·75	·428	7	90	5	8
Liverpool	...	12,590,408	134,249,967	10·66	1·128	...	...	5,303	...	·756	2·45	...	...	...	445	587
Lowestoft	35,000	308,897	2,462,188	8	1·05	70·35	...	2,646	6/2	·878	univ'rs'l p	enny fare	...	...	...	19
Maidstone	25,000	295,438	2,224,200	7·528	1·053	88·968	81	1,387	7/1	·73	1	1	6·7	128	12	19
Manchester	950,000	18,768,259	187,675,185	10	1·12	198	95·8	4,990	17/5	·713	2·368	·422	7·25	...	537	629
Nelson	45,000	200,996	2,776,785	13·82	·88	61·71	94·09	2,650	4/4	·555	1	1	8·50	108	6	11
Newport	87,626	968,067	9,251,181	9·56	·973	105·6	...	2,617	8/7	·821	1·75	...	...	...	37	44
Nottingham	260,000	3,485,789	38,484,032	11·04	1·02	148	92·08	4,514	12/8	·67	1·68	·65	6·86	...	104	135
Oldham	180,000	2,049,916	21,435,727	10·457	1·19	119·087	109·5	2,962	12/-	·822	1·115	·884	6·84	820	51·25	92
Perth	35,900	252,940	1,813,228	7·16	1·15	50·5	96·25	1,298	4/7	·73	...	...	6·25	120	8	12
Plymouth	112,000	820,406	8,839,974	10·77	1·029	78·92	...	2,528	6/9	·663	...	...	...	...	...	42
Pontypridd	40,000	470,215	4,721,110	10·04	1·07	118	83·4	2,457	10/7	·77	1·25	·81	6·5	234	18	26
Rawtenstall	50,000	553,813	4,949,775	8·93	1·23	98·72	126	1,600	10/2	·73	1·12	·88	9	198	12	24
Rochdale	130,000	1,749,967	13,740,152	7·91	1·38	105·7	114·90	2,008	12/4	·734	1·07	·90	7·66	645	43	69
Rotherham	64,000	E 772,610	8,774,539	11·35	1·104	137·12	...	3,352	12/7	·719	...	...	...	...	...	...
	...	RT 56,887	191,088	3·36	3·08	...	...	...	...	2·3	...	...	...	...	...	...
Salford	350,000	5,854,830	50,113,120	8·559	1·243	143	111	3,425	14/10	·77	1·85	·55	7·853	2,075·18	144	200
Southampt'n	122,200	1,533,638	12,475,793	8·134	1·235	102	...	3,482	10/6	·90	...	...	...	...	...	70
Southend	78,000	637,366	7,581,104	11·89	1·09	97·2	87	4,708	8/10	·634	1·41	·76	6·5	357	21	31
Southport	51,312	433,068	4,401,336	10·63	·923	140·5	103	1,574	10/10	·68	1·6	·62	6·65	217·5	15·5	26
So'th Shields	110,513	814,212	8,456,688	10·386	·942	76·5	129·2	3,332	6/1	·545	1·825	·84	7·61	282	16	35
Stalybridge	92,933	1,085,545	8,896,836	8·123	·943	95·7	...	1,280	7/6	·779	1·275	·784	6·8	...	...	60
Stockport	120,000	1,399,314	10,665,098	7·6	1·341	88·8	76·6	2,158	9/11·3	·615	1·25	·72	7·5	465	38	50
Sunderland	170,000	1,474,637	16,972,537	11·5	·968	99·8	79·3	3,366	8/1	·550	1·34	·68	7	672	42	70
Wallasey	83,000	1,261,855	12,352,000	9·78	1·11	148·94	98·7	2,893	13/10	·99	1·89	·54	7	...	...	61
Walsall	100,000	665,964	5,643,798	8·535	1·293	87	57	1,750	6/1	·769	1·24	·77	7	315	21	39
Walth'mst'w	128,000	1,151,029	11,807,549	10·258	·756	91·89	93	2,968	5/11	·655	1·15	·89	7·2	408	36	38
Warrington	86,000	449,205	6,064,139	13·5	·906	70·513	102·533	2,372	5/4	·584	1·246	·803	6·408	192·048	12·003	21
West Ham	294,200	3,544,292	40,200,347	11·34	·822	136	98	4,592	9/4	·65	1·80	·56	7·66	1,262·25	99	118
Wigan	200,000	1,449,188	13,018,833	8·98	1·314	65·1	105·5	2,309	7/2	·761	1·15	...	7·4	...	42	67
Wolverh'ton	135,000	1,168,239	11,913,122	10·198	1·08	88·25	87	2,510	8/-	·615	1·18	·879	6·85	622·2	36·6	49
Yarmouth	55,800	673,027	4,514,871	6·7	1·256	80·91	73·7	1,687	8/6	·868	1·25	·76	7	375	25	35

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast	385,492	5,946,659	58,437,942	9·82	1·07	151	128	2,539	13/-	·592	1·96	·43	8·75	2,256	141	282
Bexley	16,000	262,658	2,130,189	8·11	1·56	133	...	2,360	18/11	·95	1·37	·62	7·5	...	8	16
Birkenhead	130,832	1,235,277	13,622,361	11·02	1·077	104·12	68·64	2,540	9/4	·702	1·39	·66	6·61	511·73	49·30	59
Bournem'uth	120,000	1,882,654	15,750,576	8·36	1·45	131	95	3,214	16/-	·796	1·19	·87	6·80	1,140	60	81
Cardiff	182,729	2,614,901	28,365,277	10·84	1·09	155	98·25	4,062	14/1	·713	1·44	·736	7·5	1,120	70	130
Coventry	135,000	994,207	7,639,065	7·7	1·23	57	68	2,516	5/9	·757	1·18	·866	6·4	424	35	41
Glasgow	1,150,000	23,335,008	311,480,086	13·348	·776	270·85	105·49	5,139	17/6	·477	2·31	·44	8·13	8,484·59	606·04	843
Huddersfield	160,000	(a) 2,383,858	21,595,569	9·09	1·18	144	120	3,675	13/4	·728	1·39	·70	7·48	868·32	54·27	86
Hull	287,032	4,040,739	42,997,226	10·64	·877	149·80	127·10	5,141	10/7	·631	2·75	...	9	1,393·6	87·10	160
Leeds	500,000	8,795,465	89,668,185	10·2	1·088	179	113·35	3,594	16/3	(b) ·937	1·95	·539	7·48	3,190	213	232
Leicester	229,296	3,663,215	32,907,795	8·983	·981	143	95	3,648	11/9	·693	2·18	·984	8	1,926	107	140
London	...	H 1,056,481	11,550,504	10·93	·78	...	77·12	2,365	...	1·09	...	...	8·85	500·84	38	74
		E52,886,623	501,102,149	9·48	1·03	...	117·15	7,867	...	·69	...	...	8·82	16,427·36	1,237	1,661
Newcastle	300,000	4,780,662	52,204,974	10·92	1·082	174	...	3,738	15/2	·593	1·58	·633	7	...	...	192
Northampt'n	90,793	640,158	6,727,190	10·51	·97	76·53	...	2,974	6/-	·58	1·34	·7	6·91	...	...	26
Portsmouth	241,256	2,155,508	24,520,647	11·37	1·052	101·63	84	3,505	9/-	·511	1·66	·62	7	1,072	72	100
Preston	120,000	970,719	9,567,366	9·85	1·06	79·73	132	2,498	7/2	·603	1·01	·95	7·36	...	...	33
Reading	76,000	915,180	8,251,274	9·01	·97	108	97	2,505	8·8	·57	1·59	·68	7	352	26	36
Sheffield	466,408	8,071,188	96,330,242	11·935	·893	206·535	103·32	4,606	15·5	·517	2·62	·386	7·372	3,103·27	214·019	279
Wellington	68,000	2,303,913	23,858,412	11·08	1·40	350	90	4,706	43/11	·94	1·113	·88	7·86	803	70	89

E—Electric trolley system. H—Horse lines. (a) Including 9,417 miles coal haulage. (b) Total expenses per passenger.

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TRAMWAY AND OMNIBUS SHARE LIST.

Specially Compiled for "The Tramway and Railway World."

Amount Ranking for Dividend.	Shares.	Name.	Div'd. Prev. Half-year.	Div'd. Last Half-year.	Quotations, January 6.	Movement Since Dec. 4. Rise.	Movement Since Dec. 4. Fall.	Latest Business Done. Price.	Latest Business Done. Date.	Yield on Buying Price. £ s. d.	Dividend Due. (Final in Italics.)	Quotations, Jan., 1908, to Jan. 6, 1914. Highest	Quotations, Jan., 1908, to Jan. 6, 1914. Lowest
640,000	5	Anglo-Argentine Tramways 5½% Cum. 1st Pref.	2/9	2/9	4¹³/₁₆—4¹⁵/₁₆xd	+ ⅛	...	96/10½	Jan. 6	5 11 6	Jan., Dec.	5³/₁₆	4½
500,000	5	Do. do. 5½% Cum. 2nd Pref.	2/9	2/9	4⅞—4¹⁵/₁₆xd	...	...	86/10½	Dec. 19	6 4 0	June, *Dec.*	5³/₁₆	4⁷/₁₆
1,500,000£	...	Do. do. 5% Deb. Stock Red.	5%	5%	97½—99⅛	+ 1½	...	98⅜	Jan 6	5 0 6	June, Dec.	105½	95½
325,532£	Stk.	Auckland Elec. Trys. Co. 5% Mort. Deb. ...	5%	5%	100—102xd	...	— 1½	103½	Dec. 22	4 18 0	Jan., July.	107	99½
75,000	1	Bath Electric Tramways 5% Cum. Pref. ...	6d.	6d.	⅝—¾	...	...	14/6	Dec. 31/12	6 8 0	*Jan.* & July	¹⁵/₁₆	⅞
334,696£	Stk.	Birmingham Dist. Pow. & Tract. 4½% 1st Deb....	4½%	4½%	84—86xd	...	— 2	87½	Dec. 13	5 4 9	Jan., July.	96	77
15,000	10	Blackpool and Fleetwood Tramways	9/-	4/-	14⅛ -14⅜	+ ⅜	...	14½	Jan. 5	4 10 6	Feb., Aug.	14½	12
60,000	10	Bombay Elec. Supply & Trys. Co. 6% Cum. Pref.	6/-	6/-	10⅞—11½	...	...	10⅞	Dec. 4	5 6 9	Feb., Aug.	12½	7⅞
1,003,614	$100	Brazil Traction...	6	6	83—85	...	— 5½	83⅛	Jan. 6	7 5 3	Fb.My.Ag.Nv.	105½	83½
75,000	5	Brisbane Elec. Tramways Investment Co. Ord.	4/-	4/-	7½—7⅝	...	...	7⅛	Dec. 11	5 6 0	*May*, Oct.	9⅛	3¹⁵/₁₆
75,000	5	Do. do. do. 5% Cum. Pref.	2/6	2/6	4⅞—5⅛	...	...	5	Dec. 31	4 13 0	*May*, Nov.	5⅛	4⅛
50,000	10	Bristol Tramways and Carriage Co.	4	4	5½—6	+ ⅛	...	5½	Oct. 29	6 13 6	*Feb.*, Aug.	14½	5
50,000	10	Do. do. do. 4% Cum. Pref.	4	4	6½—7xd	+ ½	...	6½	Nov. 21	5 14 6	Jan., July.	9½	6¾
800,000£	Stk.	British Columbia Electric Railway Def. Ord..	8%	8%	104—108xd	...	—12	105	Jan. 5	7 8 3	May, Nov.	156	114
800,000£	Stk.	Do. do. Pref. Ord.	6%	6%	102—106	...	— 1	103	Jan. 6	5 16 6	Feb., Aug.	132½	103
800,000£	Stk	Do. do. 5% Cum. Perp. Pref.	5%	5%	102—105	...	...	103⅛	Jan. 5	4 17 0	Jan., July.	114	98½
1,070,097£	Stk.	British Electric Traction Prefd. Ord.	...	...	11½—13½	+ 1½	...	11½	Jan. 2	...	Apr., *Oct.*	16	8
403,503£	Stk.	Do. do. 6% Cum. Pref. ...	6%	6%	87—90	...	...	87	Jan. 2	6 16 6	Feb., *Aug.*	95½	73
1,464,245£	Stk.	Do. do. 5% Perp. Deb. ...	5%	5%	92—95	+ 1	...	92	Dec. 27	5 6 6	April, Oct.	101	82½
439,796£	Stk.	Do. do. 4½% 2nd Deb. Red. ...	4½%	4½%	77—80	...	...	78	Dec. 17	5 12 6	May, Nov.	84	58
246,625£	Stk.	Buenos Aires Port & City Trys. 6% 1st Mt. Deb.	6%	6%	84—89	...	— 2	70	Dec. 31	6 18 0	Feb., Aug.	103	61
623,270£	Stk.	Buenos Ayres Lacroze Trys. Stg. 5% 1st Mt. Deb.	5%	5%	99—101	+ ½	...	100½	Dec. 31	5 0 0	Mar., Sept.	103	89
137,610	5	Calcutta Tramways Ord.	5/-	2/6	6—6½	+ ⅛	...	6⅜	Jan. 5	5 15 6	*Apr.*, Oct.	7½	4
47,295	5	Do. 5% Cum. Pref.	2/6	2/6	4⅞—5⅛xd	...	— ⅛	5⅛	Jan. 6	4 18 9	Jan., July	5⅜	4⅜
491,222	1	Cape Electric Tramways	1/-	for '12	³³/₆₄—⁴³/₆₄	...	...	13/9	Jan. 5	6 19 3	Feb., *Nov.*	¹⁵/₁₆	⅝
15,000	10	Carthagena and Herrerias Steam Tramways ...	4/-	May, '13	3—3¼	...	...	75/-	May 6	5 6 9	April.	7	3
248,000	5	City of Buenos Ayres Tramways (1904) ...	2/6	2/6	5¼—5½	...	...	5⅛	Jan. 5	4 15 3	Fe My.Au.No	6	5⅛
120,000£	Stk.	Colombo Elec. Trys. & Ltg. 5% 1st Mt. Deb. ...	5%	5%	88—92	...	...	96	Jan. 31	5 8 9	May, Nov.	101	87
11,500	10	Cork Electric Tramways and Lighting Co. ...	...	6/- ann.	4¼—4¾	...	...	4⅛	Dec. 23	6 6 6	*Mar.*	10	4½
12,327	10	Do. do. do. 5% Cum Pref.	5/-	5/-	7—7¼xd	...	— ¼	7⅛	Dec. 29	6 18 0	Jan., July	10½	7½
3,000	10	Dublin and Lucan Elec. Railway 5% Cum. Pref.	5/-	5/-	8¼—8¾	...	...	9	Aug. 25/10	5 14 3	Sep.15, Mar.15	9½	6
60,000	10	Dublin United Tramways Co. (1896), Ltd., Ord.	6/-	6/-	10¾—11½	+ ¾	...	11	Jan. 5	5 6 9	Feb., Aug.	14	11
60,000	10	Do. do. do. 6% Cum. Pref.	6/-	6/-	11¾—12¼	...	...	12⅛	Jan. 5	4 18 0	*Feb.*, Aug.	14	11½
13,500	10	Gateshead & District Trys. Co. Ord.	9/-	5/-	8¾—9½	...	— ¼	9⅜	Dec. 15	7 11 6	*Mar.*, Sept.	9½	7⅛
268,235	10/-	Hastings and District Elec. Trys Ord.	...	...	¹⁵/₁₆—⁹⁵/₆₄	...	...	1/9	Jan. 5/12	...	...	⁹⁵/₆₄	¹⁵/₁₆
80,000	1	Do. do. 6% Cum. Pref. ...	6%	6%	¹⁵/₁₆—1⅛	...	...	12/6	June 6	8 14 6	...	1⅛	¹⁵/₁₆
125,000£	Stk.	Do. do. 4½% Deb. Stk. Red.	4½	4½	66—71	...	...	68½	Aug. 19	6 6 9	April, Oct.	100	68
$9,634,000	$1,000	Havana Elec. Rly. Co. Con. Mort. 5%	5%	5%	94½—98½	...	...	96½	Dec. 23	5 4 3	Feb., Aug.	105	80
195,000£	100	Hong Kong Tramways Co. 5% Mt. Deb. ...	5%	5%	84½—89½	...	...	88½	Jan. 6	5 12 0	May, Nov.	92	75½
20,000	10	Imperial Tramways Ord.	Nil	4% year	3½—4	...	— ¼	9¾	Oct. 29/09	10 0 0	Feb., Aug.	9⅜	2½
20,000	10	Do. 6% Cum. Pref.	...	6% year	6—6½xd	...	...	6⅞	Ju. 28/09	9 4 9	Jan., July.	9⅞	2⅞
30,000	5	Isle of Thanet Elec.Try.& Ltg. Co.5% Cum.Pref.	2/6	Dec. '12	2—2¼	...	— ⅜	46/3	Nov. 30/12	6 13 6	*Mar.*, Sept.	3	¼
250,000	1	Kalgoorlie Electric Tramways	...	...	0—⅛	...	...	1/-	Jan. 15/12	...	*May*	⅜	0
170,000	1	La Plata Elec. Trys. Co. 6% Cum. Pref. ...	0/4·65	0/4·80	⅞—1	...	...	17/-	Oct. 14	6 0 0	*April*, Oct.	1⅛	½
30,800	10	Lanarkshire Tramways	6/-	6/-	9¾—10½	...	...	10½	Nov. 24	5 17 6	Feb., Aug.	10¹⁵/₁₆	9⅜
250,000£	Stk.	Lancashire United Trys. 5% Prior Lien Deb....	5%	5%	75—79xd	...	— 2	78⅜	Oct. 11	6 6 9	Jan., July.	95	76
634,026	1	Lisbon Electric Tramways Ord.	7⅛d.	7⅛d.	1⅛—1⅜	+ ⅛	...	22/3	Aug. 25	4 7 3	*July.*	1¹³/₃₂	⅞
425,553	1	Do. do. 6% Cum. Pref ...	7⅛d.	7⅛d.	1¹⁵/₁₆—1¹⁵/₁₆xd	...	...	22/6	Feb. 15	5 1 3	Jan., July.	1½	1⅛
1,666,673	1	London and Suburban Traction Ord.	...	...	¹⁵/₁₆—1	...	...	5/3	Dec. 30	...	...	¹³/₁₆	½
1,316,268	1	Do. do. do. 5% Cum. Pref.	...	5	¹³/₁₆—⁴³/₄₄	+ ³/₃₂	...	12/6	Jan. 2	6 19 3	Feb., Aug.	⁴³/₄₄	¹⁵/₁₆
1,000,000£	Stk.	London General Omnibus 4½% 1st Deb.	4½	4½	94—96xd	...	— 1	95½	Jan. 6	4 13 9	Jan., July.	98½	92½
1,000,000£	Stk.	Do. do. 5% Cum. Income ...	5	5	86—88	+ 1	...	87½	Jan. 6	5 16 0	Feb., Aug.	94	85½
1,649,930£	Stk.	London United Tramways 4% 1st Deb. Stk. ...	4	4	58—62xd	...	...	60⅛	Dec. 20	6 9 3	*Jan.*, July.	82	54½
63,430£	Stk.	Madras Elec. Trys. (1904) Ltd. 5% Deb. Red. ...	5%	5%	99—101xd	...	— 2	101½	Oct. 16	4 19 0	Jan., July.	105	86
20,000	5	Do. Do. Do. 6% Cum. Pref. ...	...	...	4¾—5¼	...	...	5⅛	Dec. 3	5 14 3	...	5¹⁵/₁₆	87 6
300,000£	100	Manaos Trys. & Ltg. Co. 5% 1st Debs.	5%	5%	79—82xd	...	— 5	83	Dec. 17	6 2 0	Jan., July.	97	86
$4,785,000	$1,000	Manila Elec. R. R. and Ltg. Corp. 5% Gld. Bds.	5%	5%	96½—98½	...	...	96	Dec. 16	5 4 6	Mar., Sept.	104⅜	84
60,000	1	Mansfield & District Trys. Ltd. 6% Cum. Pref.	7⅛d.	7⅛d.	⅞—1	...	...	18/6	Sept. 24	6 0 0	Mar., Sept.	1¹/₁₆	¾
$20,000,000	$100	Mexico Tramways Common Stock	$3½	$3½	63—66	...	— 15	62	Jan. 6	10 18 9	Fb.My.Au.No	151½	65
$3,840,000	...	Michigan Untd Rys. Co. 5% 1st Debs & Refdg Bds	5%	5%	91—93	...	...	91½	Jan. 5	5 10 0	May, Nov.	101½	89½
600,000£	100	Montreal Street Rly. 4½% Ster. Debs.	4½%	4½%	99—101	...	— 3	99½	Dec. 29	4 10 0	Fe.My.Au.No.	107	97
150,000	1	National Steam Car	6%	year	¹⁵/₁₆—1	...	— ³²/₃₂	17/3	Jan. 6	6 8 6	Dec.	39/9	18/-
5,000	10	Oldham, Ashton, and Hyde Elec. Tramways Ord.	7/-	5/-	5½—6	...	— ⅛	7	Apr. 2	10 0 0	Mar., Aug.	9⅜	6⅛
5,000	10	Do. do. do. 5% Cum. Pref.	5%	5%	6⅜—6⅝	+ ¼	...	6¹⁷/₂₀	July 8/12	7 18 0	Feb., Aug.	8⅜	6½
77,893	5	Para Elec. Rly. and Ltg. Co., Ord.	5/-	5/-	5—5½	...	— ½	5½	Jan. 5	9 2 0	May, Nov.	8	5
100,000	1	Perth (W.A.) Electric Tramways Ord.	6d.	7½d.	1¹/₁₆—1¹/₁₆	...	...	25/6	Nov. 8/12	4 7 9	*Sept.*, Nov.	26/10½	⅝
245,000	1	Potteries Electric Traction Ord.	3½	for '11	¹⁵/₁₆—1	...	...	8/3	Nov. 3	8 0 0	April.	¾	⅜
245,000	1	Do. do. 5% Cum. Pref. ...	6d.	6d.	¹⁵/₁₆—1	...	...	12/6	July 2	7 5 6	*Feb.*, Aug.	¾	¹⁵/₁₆
124,560	1	Provincial Tramways Ord.	10d.	8d.	⁴³/₆₄—¹¹/₁₆	...	— ¹/₁₆	18/-	Nov. 11	9 17 6	May. *Nov.*	1¹/₁₆	13/-
10,000	10	Do. do. 6% Cum. Pref.	6/-	6/-	9—9½xd	...	— ⅛	9½	Oct. 30	6 9 9	June, *Dec.*	11	9
50,000	5	Rangoon Elec. Trys. & Supply Co. 6% Cum. Pref.	3/-	3/-	5—5½xd	...	— ⅛	5¹/₁₆	July 17	5 9 3	June, Dec.	6	5
32,000	10	Shanghai Elec. Construction Co.	10/-	year	10—11	...	— ½	10⅜	Dec. 29	4 7 0	May.	11½	6
330,400£	Stk.	Singapore Elec. Trys. Ltd., 5% Debs. Red. ...	5%	5%	86—90	...	...	87	Dec. 15	5 11 3	Mar., Sept.	89	61
169,570	1	S. Metrop'n Elec. Trys. & Ltg. Co. 6% Cum. Pref.	1/2⅜	May, '13	⅜—¾	...	...	15/9	May 16/12	8 0 0	Feb., Aug.	1⅜	⅝
91,720£	Stk.	Southern Elec. Trys. of B.A., 1st Mt. Deb. ...	5%	5%	93—95	...	...	94½	Aug. 7	5 4 9	Feb., Aug.	100	90
471,500£	100	Toronto Rly. Co. 1st Mt. 4½% Stg. Bonds ...	4½%	4½%	97—99	...	...	98½	Nov. 26	4 12 9	Feb., Aug.	104	97
80,000	5	United Elec. Tramways of Monte Video, Ord....	3/-	4/-	4⅜—4⅞	...	— ⅛	4⅞	Nov. 6	7 3 9	*June*, Dec.	6½	4⅜
90,000	5	Do. do. do. 6% Cum. Pref.	3/-	3/-	4⅜—5¼	...	— ⅛	98/9	Dec. 15	5 17 3	June, Dec.	6⅜	4¹/₁₆
500,000£	Stk.	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Debs.	4½%	4½%	95—97	...	...	100	Oct. 31	4 13 9	Apr., Oct.	109½	94½
40,977	5	Yorkshire (West Riding) Elec. Trys. Ord. ...	...	...	¼—⅜	...	...	8/-	Oct. 31	...	*Mar.*	1½	¼
46,261	5	Do. do. do. 6% Cum. Pref.	1/6	2/6	3½—4xd	...	...	76/3	Dec. 30	5 0 0	*Mar.*	4	1½

ELECTRIC RAILWAY SHARES.

1,854,720£	Stk.	Central London Ord. Stock (4% Guar.)	...	...	82—84	+ 3	...	82¾	Jan. 6	4 16 6	*Feb.*, Aug.	89⅛	59⅝
572,640£	Stk.	Do 4% Guar. Pref. Stock	4	4	82—84	+ 1	...	82¼	Nov. 6	4 16 6	Feb., Aug.	92	80
572,640£	Stk.	Do. Deferred Stock (4% Guar.) ...	...	...	78—80	+ 1	...	78¾	Jan. 6	5 1 3	Feb., Aug.	91⅜	42
50,000	10	Liverpool Overhead Ord.	2/-	2/6	4¹³/₁₆—4¹⁵/₁₆	+ ⅜	...	95/-	Jan. 3	4 13 9	*Feb.*, Aug.	4¹³/₁₆	⅜
1,412,263£	Stk.	Mersey Cons. Ord. Stock	Nil	Nil	5—5½	...	...	5	Jan. 6	...	*Feb.*, Aug.	8	1
5,732,062£	Stk.	Metropolitan Cons.	1⅜	1½	46½—47	+ 4¾	...	46¾	Jan. 6	3 9 3	*Feb.*, Aug.	75⅛	34
2,640,914£	Stk.	Do. Surplus Lands Stock	2¼	2⅜	58—60	...	...	58	Jan. 2	4 10 3	*Feb.*, Aug.	72	58
3,235,000£	Stk.	Metropolitan District Ord.	Nil	Nil	31½—32	+ 1½	...	31¹⁵/₁₆	Jan. 3	...	*Feb.*, Aug.	51½	9½
500,000	10	Underground Electric Railways Co. of London ...	...	...	3½—3⅝	...	+ ¼	68/1½	Jan. 3	...	...	5¹⁵/₁₆	1⅜
1,730,000£	...	Do. 4½% Bonds of 1933	4½%	4½%	97—99	...	— 2	97¼	Jan. 5	4 11 0	Jan., July	102	73
1,192,707£	...	Do. 6% 1st Income Debs.	6%	6%	112—114	+ 1	...	113	Jan. 6	5 7 3	Mar., Sept.	117½	108
6,120,750£	Stk.	Do. 6% Income Bonds	60/-	60/-	90—91	+ 1	...	90½	Jan. 6	6 13 6	Mar., Sept.	97½	18
1,150,477	1/-	Do. "A" Ord.	...	...	¹³/₃₂—¹⁵/₃₂	...	— ¹/₃₂	8/6	Jan. 2	...	...	⅞	⅜

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PERSONAL.

Mr. J McEntree, of Belfast, has been appointed assistant electrical engineer to Dunkald Council.

Mr. G. F. Taylor, electrical engineer and manager of Nelson Corporation tramways, has had his salary raised from £180 to £200.

Mr. J. B. Hamilton, of Leeds, has been engaged to advise Ealing Council in the negotiations with the London United Tramways Company.

Mr. W. B. Cownie, of the National Electric Construction Company and other tramway undertakings, is paying a visit to Constantinople.

Mr. E. S. Riley, of Hull, has been appointed assistant on the engineering staff at the Walthamstow electricity works at a salary of £150 per annum.

Mr. J. Wild, inspector in charge of the railless trolley cars of Ramsbottom Council, has received an increase of salary and been appointed manager.

Mr. J. Fitzgerald, of the Bristol Corporation electricity department, has been appointed as representative engineer in the Bristol branch of Simplex Conduits, Limited.

Mr. Gordon Bryant, electrical engineer to Great Yarmouth Council, has had his salary increased from £400 to £450, to be followed next September by an addition of £50.

Mr. A. Coveney, general manager and electrical engineer to Erith Council tramways, has received an increase in his salary from £350 to £400 per annum as from November 17 last.

Mr. G. White has been appointed rush traffic ticket inspector by the Mexborough and Swinton Tramway Company, after seven years' service as a motorman. He was formerly at Wakefield.

Mr. J. W. Blakemoor, chief traffic clerk, Salford Corporation Tramways, has been recommended for appointment to the post of traffic superintendent, and Mr. F. Ellwood as chief traffic clerk.

Alderman Smethurst is to be presented by the Warrington Electricity and Tramways Committee with a vote of thanks, engrossed on vellum, in recognition of his many years' service on the committee.

Mr. H. Underwood, repairs foreman at Greenwich generating station of London County Council Tramways, has been appointed boiler house charge-engineer, at a salary of £250 a year, rising by annual increments of £10 to £300 a year.

Mr. L. Garner McLean, chief assistant power and distribution engineer to the London United Tramways Company, on leaving to take a position in India, has been presented by the staff with a case of drawing instruments, a pipe, and a cigarette holder.

Mr. R. W. Bruce, of London, has been appointed general superintendent and chief engineer of the Canada Electric Company, Amherst, N.S. He will also have charge of the electrical equipment of the Maritime Coal, Railway, and Power Company at Joggins Mines.

Mr. W. Yorath Lewis has been awarded the Society of Engineers' premium for his paper on "The Omnibus *v.* Tramway Controversy, and other Aspects of the London Traffic Problem," which was read at the meeting of the Society on February 3, and was referred to in our issue of February 8.

Mr. H. G. Sabine, formerly chief ticket inspector to the Isle of Thanet Tramways Company, who now holds an appointment in the Government Tramways of Western Australia, has sent his old colleagues at Ramsgate Christmas greetings in verse. In his new sphere he is known as the "tramway poet."

Mr. Peter Fisher, general manager, Dundee Corporation Tramways, and Mr. Robertson, Greenock borough electrical engineer, are advising Stirling Corporation on the questions whether that body shall construct electric tramways or dispose of their electricity undertaking for £32,000 to Messrs. Balfour, Beattie, and Company.

Mr. Nichols Moore, Newport borough electrical engineer and permanent way engineer of the tramways, has been awarded an honorarium of 25 guineas, and Mr. Thaine, deputy engineer, 10 guineas, in recognition of their work in connection with the installation of new plant at the generating station. The workmen are to have a sum of 25 guineas divided amongst them.

Mr. H. W. Laing, general manager and electrical engineer to Blackpool, St. Anne's, and Lytham Tramways Company, was referred to at the annual meeting by the chairman, Mr. Geo. Nicholson, who stated that the traffic expenses, costs, and the cost of current per car-mile continued to be the lowest in the country. They owed this result to the constant care and viligance of their manager, Mr. Laing, who was deserving of their thanks.

Mr. S. E. Smith, one of the directors of the Bristol Tramways and Carriage Company, presided on December 20 at the first annual staff dinner of the motor constructional works of the company, which have now been open for a year. In responding to the toast of the motor constructional works, the chairman said they had a very well-filled staff, the only link missing being that of works manager, but they hoped to fill that vacancy very soon. They had works that were as well equipped as any in the country.

Mr. Henry Mattinson, A.M.Inst.C.E., permanent way engineer to the Manchester Corporation Tramways, has been appointed chief civil engineer to that department, under an agreement for four years, at a salary of £500, rising to £600. Mr. Mattinson recently accompanied Mr. McElroy, the general manager, on a tour to the principal cities of the Continent, United States, and Canada, to study the methods of dealing with local passenger transportation in those countries, the congestion of traffic in Manchester calling for urgent attention.

Mr. I. Bulfin, Bournemouth tramways manager, on Boxing Day entertained the night staffs of all the depots to breakfast for the fourth successive year. In the unavoidable absence of Mr. Bulfin, Mr. Hartley, superintendent of car sheds, wished the company a very enjoyable time and a prosperous and happy New Year. Hearty cheers were given for Mr. and Mrs. Bulfin and Master Bulfin. On Christmas Eve Mr. Bulfin presided at the annual dinner of the men of the Parkstone depot, when the toast of the manager and family was musically honoured and Mr. Bulfin was thanked for his generosity.

Expert Aid Suggested for Directors.—Mr. Fleming, a shareholder, speaking at the Burma Tramways Company meeting, said he did not suggest that the company was not well managed, but he suggested that the directors should allow the stockholders to have on the board a modern tramway operating man. In reply, the chairman observed that the fees of the directors amounted to the large sum of £100, and an expert was not going to devote his time to the company for £100 per annum. But the suggestion should be considered, and if they saw any prospect of getting such assistance they would be only too delighted.

Messrs. C. W. Bentley and R. Watson, respectively manager and electrical engineer and secretary of the Musselburgh Tramways Company, were referred to by Bailie Constable at the annual concert of the recreation club, as having interested themselves in all that tended to the welfare of the borough. He also spoke of the civility of the employees. Mr. Bentley read a letter from Mr. W. B. Cownie announcing that he should have pleasure in recommending to the directors the increase in the employees' pay suggested by Mr. Watson and Mr. Bentley. Mr. Cownie also stated that he was sure the staff would do their best to improve the results during the coming year, and if an improvement was again shown the management would have his support if they were in a position to recommend a bonus next year.

Mr. A. C. Morgan, late manager to the Burma Electric Tramways Company, was referred to by Mr. Ellis, who presided at the annual meeting. He joined the company's service at the beginning of the company's operations as assistant manager, and since August, 1908, had been in charge. The chairman stated that Mr. Morgan retired on October 31 on the expiration of his agreement, and the directors desired to place on record their appreciation of the excellent services rendered by Mr. Morgan. As the system was now thoroughly well organised, the directors had not filled the vacancy, and the duties were being carried out by the chief engineer, Mr. A. H. Burbidge, under the title of chief engineer and manager. Mr. Burbidge went out from England quite recently, and had had a very thorough experience of similar work here.

Mr. T. J. Kendrew, general manager, Southport Corporation Tramways, who presided at a dinner of the tramways and electricity employees, thanked the staff for the way they had assisted him since his reinstatement as manager of the tramways. The results of their endeavours had been highly satisfactory, and from the office staff to the depot men every man had done his duty. It was only a week or so ago that a high compliment was paid the men by the Tramways Committee for their satisfactory service since the tramways and electricity departments had been divided. He urged every man to take a pride in his uniform, and said that appearance went a long way in a man's life. Mr. J. Orme, on behalf of the Social and Athletic Club, thanked the manager for his kind remarks about the staff, and said every man would do his level best.

Mr. Hopper, chief assistant engineer and deputy manager to the Rhondda Tramways Company, has resigned that appointment in order to take up the duties of engineer and manager to an electric supply undertaking which the National Electric Construction Company are providing at Wisbech. In recognition of his six years' service at Rhondda he has been entertained at a farewell assembly by the staff and employees. Mr. H. J. Nisbett, the resident engineer and manager, who presided, said that whilst wishing Mr. Hopper success in his new undertaking, he felt that he was losing a valuable assistant. Mr. Hopper and himself had worked together for ten years, as they spent five years together at Sheerness before coming to Rhondda. The Porth Hospital Carnival Committee, of which body Mr. Hopper has been a member, presented him with a gold-mounted walking stick.

From Cleaner to Traffic Superintendent.—In announcing at a presentation to the departing traffic superintendent at Oldham, that Mr. J. Brierley had been appointed to fill the vacancy on a 12 months'

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trial, Mr. Dugdale, the manager, said Mr. Brierley had worked up from the bottom of the ladder. Mr. Dugdale strongly urged the young men to do all they could to improve their education and fit themselves for promotion. Two more men would shortly be promoted as motor inspectors and they would have higher rank than the ticket inspector. He thought they had two men in their shops fit for the work. Mr. Brierley began his career as a car cleaner on the Oldham steam tramways, and for a portion of his four and a half years' service in the steam traction era he also worked as a driver. When the electrification was effected in 1900 he became a motorman, and subsequently he entered the repair shop. After rising to be deputy shed foreman, he was appointed inspector six years ago, and in 1911 chief inspector.

Mr. Charles Furness has received from Blackpool Council the increase of £200 recommended by the Tramways and Electricity Committee in his salary as tramways manager and electrical engineer. His total remuneration will thus be £900 per annum. Alderman Brodie said that Mr. Furness's work warranted the increase. He was appointed electrical engineer twelve years ago at £520 per annum, which was later increased to £600. On the death of the late manager, four years ago, Mr. Furness was appointed to that position, practically as a experiment, with another £100 per annum. At that time the profits were £8,000 per annum. The following year the profits were £10,000, in March last £18,360, and it was estimated that for the present year they would be £25,000. The electricity profits had been as low as £58 and as high as £8,000, and this year the profit would be £7,000. Mr. Furness had brought about a general saving in the consumption of coal. When he came they were using 15,000 tons compared with 12,000 to-day. In addition, the current had been doubled in quantity.

Glasgow Salaries.—By 32 votes to 19, the Corporation adopted the following scale of salaries recommended by the Tramways Committee: General manager—Minimum salary per annum £1,000, maximum salary £1,400, annual increment each year until the maximum is reached £50; salary of present holder of the office, £1,100. Traffic manager—Minimum £400, maximum £700, annual increment £25; present salary £625. Chief engineer—Minimum £400, maximum £700, annual increment £25; present salary £625. Electrical engineer—Minimum £400, maximum £700, annual increment £25; present salary, £575. Secretary and treasurer—Minimum £400, maximum £700, annual increment £25; present salary £425. Replying to an objection that the general manager's ultimate salary of £28 per week would be more in pounds than the lower paid conductor would have in shillings, Mr. Alexander said that general managers of tramways such as those in Glasgow received much larger salaries than they had ever thought of paying Mr. Dalrymple.

Mr. C. G. Tegetmeier, chairman of the Swansea Improvements and Tramways Company, and Mr. S. E. Garcke, a director, attended the annual dinner of the employees. Mr. David James, the general manager, presided, and in proposing the toast of the company, said that the chairman joined the board the year following the opening of the electric system. From that time the shareholders saw some returns. A great deal of leeway would have to be made before adequate returns were given for the capital that remained idle. Mr. Tegetmeier was a man of great business capacity, and he had the utmost sympathy for his employees. Mr. James thanked the men for their help in the past, and assured them the success of the company was also that of the men's. Mr. Tegetmeier, in reply, remarked that on a previous occasion Mr. James stated that no service could be truly efficient unless it was a contented service, and he thought he could rightly assume that they were contented. In those days of industrial warfare it was pleasing to dwell upon their amicable relations. Mr. James had put in 33 years' service. Mr. Tegetmeier also referred to such old employees as George Mitchell (with 36 years' service), W. James (32 years), N. Davies (33 years), and David Atkins (36 years). Mr. James was a friend of all of them, and still preserved the energy and enthusiasm that distinguished him when he entered the service.

Mr. Christer P. Sandberg died at an advanced age on December 4, at 4, Crystal Palace Parade, Upper Norwood. He was the author of the specification of the silicon steel rail, and was one of the oldest members of the Institution of Civil Engineers.

Mr. John Glenn, consulting engineer to the Portsdown and Horndean Light Railway, and a director of the company, died a few weeks ago. Mr. Glenn, who was 75 years of age, had been connected with the Provincial Tramways Company for 40 years as consulting engineer to that company and its local undertakings. He was a brother of Mr. J. Barber Glenn, the managing director.

The Late Mr. T. Blane.—Reference was made by Mr. G. Nicholson, the chairman, at the annual meeting of the Blackpool, St. Anne's, and Lytham Tramways Company, to the death of Mr. Thos. Blane, formerly chairman of the company, which occurred shortly after the last annual meeting. The board, Mr. Nicholson said, had lost a valued colleague, whose wide experience and sound judgment were always readily placed at the call of his colleagues. To fill the vacancy Mr. Thos. Preston, of St. Anne's, had been elected a director.

CONTRACTS AND ORDERS.

Babcock and Wilcox, Limited, have received a contract to supply two mechanical stokers to East Ham Council, at £534.

Batley Council have accepted the tender of the Brush Electrical Engineering Company for a 1,200-KW. turbo-generator.

Leyland Motors, Limited, have received a contract for the supply of a motor tower wagon to Accrington tramways, at £610.

St. Helens Council have allotted a contract for the supply of cable to Callender's Cable and Construction Company, Limited.

Edgar Allen and Company, Limited, have secured a contract for the supply of a cross-over to Southend tramways, at £620.

Leyland Motors, Limited, have received an order from Accrington tramways department for a petrol motor tower wagon.

Prahran and Malvern Tramways Trust have given a contract to the Steel Company of Australia for points and crossings, at £917.

Keighley Council have adopted the tender of the British Thomson-Houston Company, Limited, for supplying a spare motor, at £500.

The Lorain Steel Company have secured the contract for special trackwork, amounting to about £42,000, for the St. Petersburg tramways.

Tudor Accumulator Company, Limited, have received a contract from Salford Council to weld 600 tramway rail joints at 30s. per joint.

The Metropolitan Railway have placed a contract for the supply of Tantalum and Wotan traction lamps with Siemens Brothers Dynamo Works.

Sheffield Council have placed an order with the Brightside Foundry Company, Limited, for installing hot-water apparatus at Holme Lane car depot, at £73.

Winnipeg Council have awarded contracts to the Canadian General Electric Company for three 600-KW. transformers and to Ferranti, Limited, for switches.

Rotherham Tramways Committee have placed a repeat order with E. Bennis and Company, Limited, for two machine-stokers and self-cleaning compressed-air furnaces for a Lancashire boiler.

Walsall Council have given a contract to G. Robson and Company for a combined electric track grinder and drilling machine, and to the General Electric Company, Limited, for sub-station gear, at £41 10s.

The Anger Manufacturing and Supply Company, Limited, of Bank Chambers, Preston, have received an order for 150 more sets of their brake adjuster for the Anglo-Argentine Tramways of Buenos Ayres.

Norwich Council have placed a contract with C. A. Parsons and Company, Limited, for a 3,000-KW. turbo-alternator, complete with condensing plant, at £8,588, and two 1,000-KW. rotary converters by Siemens Brothers Dynamo Works, Limited, at £4,240.

Chesterfield Council have placed the following contracts: Three car bodies at £469 each, Brush Electrical Engineering Company; electrical equipment for three cars, at £282 per car, and electrical track brakes at £55 each, British Westinghouse Company.

Wolverhampton Council have accepted the following tenders: Willans and Robinson, Limited, 4,000-KW. turbo-alternator with condenser, and steam and water pipes, £13,159, and A. Reyrolle and Company, Limited, switch gear for the extension plant, £650.

Bell's United Asbestos Company, Limited.—The War Office has accepted this company's tender for the supply during three years, 1914 to 1916, of asbestos cement roofing slates, wall and ceiling sheets. These will be made at the company's Poilite factory, near London.

Bournemouth Council have allotted contracts as subjoined: United Electric Car Company, car bodies and vestibules; Brush Electrical Engineering Company, trucks (Brill type); British Westinghouse Electric and Manufacturing Company, Limited, electrical equipment, £343, and brakes, £150.

Mr. John Taylor, of 7, Strand Street, Liverpool, has recently received the following orders for his patent tubular sand controllers: Doncaster Corporation, 100; Sheffield Corporation, 122; West Ham Corporation, 192; Manchester Corporation, 60; Blackpool Corporation, 28; and Newport (Monmouth) Corporation, 12.

Tramcars for Russia.—The Council of Ministers has approved of the proposals to authorise St. Petersburg and Samara municipalities to purchase electric tramcars from abroad, if necessary. The orders, however, must be given to Russian works if their prices do not differ considerably from the prices tendered by foreign works.

International Railophones, Limited, report that they have just received a third trial order from the Swiss Federated Railways for "K.K." detectors. They also mention that with the aid of this instrument it has been found possible to transmit telegraphic messages through the St. Gothard tunnel. This it has previously been found impossible to do.

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Glasgow Tramways Committee have accepted the following tenders: Telephones, J. McMillan and Company; white lead, Hird, Hastie, and Company; adhesive tape, A. Avtsine; car bells, Standard Electric Company, Limited; car brake chains, Weldless Chains, Limited; trolley cord, W. C. Yuille and Company and W. G. Black; rubbers for snow ploughs, George M'Lellan and Company.

Manchester Corporation have placed contracts as follow: 1,800/2,200-KW. converter for Dickinson Street sub-station, Bruce Peebles and Company, Limited; supply of 12 months' requirements of static transformers, Ferranti, Limited; cable, W. T. Glover and Company, Limited, Liverpool Electric Cable Company, Limited, Charles Macintosh and Company, and Johnson and Phillips, Limited.

Montreal Railway Contracts.—The Canadian General Electric Company have received a contract from the Montreal and Southern Counties Railway Company for the electrical equipment of the Rougemont sub-power station. The Canadian Westinghouse Company, of Hamilton, have obtained a contract for the electrical equipment of an order of cars, from the National Steel Company, for the same railway.

Siemens Brothers Dynamo Works, Limited, have received the contract for supplying the switch gear and accessories for the electric power-station in connection with the Melbourne suburban railway electrification scheme, the amount being £140,000. The plant will be manufactured in Great Britain. The contract for the condensing plant has been awarded to the G. Weymouth Proprietary, Limited, of Richmond (V.), at £85,251.

West Hartlepool Council have allotted contracts as subjoined: Five tramcars with flexible axle trucks, United Electric Car Company, Limited; electrical equipment and spare parts, Dick, Kerr and Company, Limited; points and crossings, Hadfield's Steel Foundry, Limited. Mr. W. S. Tatham, of West Hartlepool, is to be negotiated with in reference to his quotation for taking out the quantities for the car shed extension.

Petrol-Electric Cars for Hastings Esplanade.—As already reported in these columns, W. A. Stevens, Limited, have received an order from the Hastings and District Tramways Company for 20 petrol-electric tramcars for service in connection with the sea front section of the tramways. The Board of Trade's licence to the company to continue the use of the Dolter surface-contact system expired on January 1, but as the petrol-electric cars will not be delivered for two or three months the Tramways Company and the Corporation have asked the Board to renew the licence.

Sydney Council have placed the following contracts: Babcock and Wilcox, Limited, pneumatic ash handling plant for new boiler house, £3,400, plus £800 duty, and 1,200 wheels, 1,200 bushes, 600 pins, and 600 washers, £157 10s. (estimated); Willans and Robinson, Limited, two circulating pumps for two turbine sets, £540, and oil pump for three 4,000-KW. turbines, £53 3s.; Australian Engineering Supply Company, 100 boiler tubes, £135; Australian General Electric Company, three remote control oil switches, £55; W. Adams and Company, feeder pillars, £970.

London County Council have accepted the following tenders: Cammell Laird and Company, 18 tons of special hard-rolled steel, £184 10s.; British Westinghouse Company, 16 armatures (class 220), and 80 field coils of the same type, £38 18s. per armature and £6 per coil; A. B. Coupler, Limited, 20 coupler heads, £60, one buffer head, six buffer head couplers for tractors, and three buffer head couplers for trailers, 45s., 60s., and 45s. each respectively; A. and F. Manuelle, 8,300 tons of Guernsey granite setts required over a period of 12 months and delivered at various wharves and depots, £13,858; Cammell Laird and Company, 100 axle forgings of 5¼ in. diameter, £2 1s. 9d. each, less 2½ per cent. discount, £203 10s. 7d.; John Stirk and Sons, Limited, Halifax, machine for cutting high checks on tramway rails, £1,020; Mr. R. L. Lundgren, Queen Victoria Street, E.C., 125 tons of white and 200 tons of coloured pulp for tramway tickets, at £10 a ton for white and £11 a ton for coloured, less 5 per cent. discount; Mr. R. R. Todd, High Holborn, W.C. (agent for Felten and Guilleaume), 2⅛ tons of T.C.C. copper wire, ·229 in. diameter, £84 11s. 8d. a ton, and 7½ tons of D.C.C. copper wire, ·229 in. square, £85 15s. a ton, both less 2½ per cent. discount; Newton Brothers, spare materials for reconstruction and rewinding of motor generators, £320 7s.; J. G. Ingram and Son, Hackney Wick, N.E., repair of 200 burnt and damaged moulded indiarubber plough bases, £206 5s.

Aberdeen Manager's Change-Holding Device.—Mr. R. S. Pilcher, general manager of the Corporation Tramways, has patented a money-changing device. The instrument comprises five brass clips attached to a solid base of the same metal. The clips are capable of safely holding coins from the size of a sixpence to a penny, and are kept closed by means of spring hinges. In the first clip 5d. is placed, in the second 11d., in the third 1s. 11d., in the fourth 2s. 5d., and in the fifth 4d. The clip is easily replenished during the intervals between stopping places. The conductors are unanimous in its praise.

TRAMWAY AND LIGHT RAILWAY NOTES.

BEXLEY.

INCREASES OF SPEED APPLIED FOR.

The Board of Trade have been asked to approve of certain increases of speed on Bexley Council Tramways now that new trucks, fitted with electro-mechanical brakes, have been adopted.

BIRMINGHAM.

ECONOMY OF A SEPARATE TRACK—FIRST-CLASS AND TRAIL CARS—SUCCESS OF THE TRAMWAYS—PASSES FOR THE BLIND.

The impending extension of the tramways to Northfield is to be constructed on a separate track, and the rails will be laid on sleepers. By adopting this course the chairman of the Tramways Committee estimates a saving of about £3,000 per mile of road for paving, besides effecting economy in maintenance.—Over 6,000 persons have signed a petition in favour of an all-night service of cars.—It is expected that the first-class tramcars for the Hagley Road route will be placed in service in the course of a few weeks.—Councillor Harrison Barrow, chairman of the Tramways Committee, recently stated that while in April, 1911, the city possessed 34 miles of tramways, on March 31 last there where 62 miles. The Corporation now had 600 cars. The sum of £220,000 had been placed to the reserve fund, and £215,000 to the sinking fund, on a capital of two millions. In four years they had pactically put by 20 per cent. of the capital, which was a good record. The Tramways Committee hoped shortly to have a number of trail cars running. These would be a great convenience to the workmen, greatly increasing the accommodation at a small expense.—The Tramways Committee having decided to carry blind people free of charge; the order came into force on January 1. It is estimated there are about 500 blind people.

BLACKPOOL.

ILLUMINATED AND POCKET MAPS.

Transparent maps of the tramways system, which will be illuminated at night, are to be fixed in prominent positions. Last season the Corporation tramways manager had a similar map placed in the vicinity of Talbot Square for the convenience of visitors, showing all the principal places of entertainment and public buildings. In order further to popularise the cars, the committee have ordered another 100,000 pocket maps of the tramway system for distribution. Three more top covers are being obtained, bringing the total of this class of car to 25.

BRISTOL.

NUMERALS FOR CAR AND OMNIBUS SERVICES.

In consequence of the increase in the tramcar and omnibus services the Tramways and Carriage Company have decided to number the vehicles according to routes. The tramcars, in addition to having the indicator at each end naming the termini, will be furnished with a service number up to 17. Similarly the motor omnibuses will bear figures from 18 to 32.

BURY.

MANAGER'S JUDGMENT OR DOCTOR'S CERTIFICATE?

A question having arisen between the Tramways Committee and the men's union with regard to a motorman's fitness to resume duty after illness on producing a medical certificate, the committee have adopted the advice given by the town clerk, which was supported and confirmed by the opinion of eminent counsel. It was to the effect that the Corporation would not be relieved from responsibility in the event of an accident arising during the time a car was being driven by a motorman who was, in the manager's opinion, not in a fit physical condition to drive a car, even if such motorman produced a doctor's certificate of fitness. The committee recommended that the manager be instructed to use his own judgment as to the advisability or otherwise of allowing a motorman to recommence duties after an illness. The Corporation have adopted the recommendation.

DARWEN.

FACILITIES FOR PASSENGERS—THE MANAGER'S WIND SCREEN.

It has been decided by the Tramways Committee in the cases of old people and cripples the cars shall pick up and set down at the nearest places to their homes, and not necessarily at the fixed halts. On Sundays stops will be made opposite the various churches.—The Tramways Committee have sanctioned the use of the wind screen, designed by the general manager, Mr. F. J. S. Hosken, on 10 open cars. The top portion of the screen provides space for advertisements.

DERBY.

SAVING EFFECTED BY USE OF CAR METERS.

In the annual report of Derby Corporation Tramways, the economy in expenditure on current due to the use of traction meters, is estimated at £745. As showing the effect of the meters on the driving, it is mentioned that only 660 brake shoes were issued from the stores, a decrease of 326, notwithstanding a slight increase in mileage. The average consumption of electricity per car-mile was 1·168 units, the lowest since the first year of the system, 1904-5, when the average was 1·042. The total consumption was 1,357,232 units at a cost of £8,199.

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these totals comparing with 1,480,150 and £9,026 respectively for the previous year.

GLASGOW.

1,000 Cars—64 per cent. Halfpenny Fares—Centre Standards—Enforcement of By-Laws.

The Corporation have instructed the department to proceed with the erection of 150 additional cars, which will bring the total up to 1,000 cars. A few years ago Glasgow prided itself on carrying on an average 11 passengers per mile; the third week in December showed an average of 15. No city in the kingdom, it is said, equals those figures. On the longest route—Paisley to Uddington and Baillieston—695,000 persons were carried in the above week, 407,000 being half-penny fares. Over the whole system fully 64 per cent. were halfpenny fares. Passengers travelling the penny distance were almost 27 per cent., which left only 9 per cent. of the whole over a penny. The average for each passenger is about ¾d. Whilst motorists are asking for the removal of the centre standards, others are declaring that there is no evidence of any desire on the part of the ratepayers in Hillhead and Kelvinside for the removal of "these splendid elements of safety for the pedestrian." The poles, it is contended, serve a useful purpose in splitting the traffic, and if the scorching motorist is compelled to slow down the public are all the better pleased. As the result of sending out plain clothes men, 800 cases had been reported in which persons were alleged to have offended against the by-laws, more especially on the part of boys hanging on to cars, smokers spitting on the upper deck, and carters obstructing cars. About 60 of these cases were down for hearing on December 24, when the stipendiary magistrate imposed fines in some cases. A considerable number of the summonses against carters were withdrawn after a discussion as to what constitutes a sufficient reason for a carter travelling on the rails.

ILKESTON.

Bonuses to Employees for Special Services.

Mr. L. C. F. Bellamy, manager and electrical engineer, has reported that the traffic receipts during Fair week amounted to a record sum, and that after consulting the chairman and deputy-chairman he had granted a bonus to each driver and conductor in recognition of their care in avoiding accident or missed fares. The committee approved this action.

LEEDS.

Tramway Employees Defeated in a Syndicalist Strike.

On December 11, 3,000 workmen employed by the Leeds Corporation left work at the bidding of one individual, and against the advice of their more sensible leaders, in an effort to secure an immediate advance of 2s. a week all round. The tramway men were not directly affected in the dispute, for, under agreement, they were bound not to put forward any new claims until February. Their union, however, which is affiliated to the Federal Council, had promised "moral" support in the dispute in return for similar service later. On the ground that "blackleg" labour had been introduced at the power-station, the union tramway men, after taking a ballot, joined the strikers on December 13. With the aid of the loyal employees, the tramways department kept a reduced service running every day during the following week, but in the evening the cars were withdrawn in order to prevent damage by stone throwing. The police, having received reinforcements from neighbouring towns, were able to place a guard on the car platforms, but on December 17 the number was reduced to one constable inside each car. Mr. J. B. Hamilton was inundated with offers of help from the citizens, but he was able to rely entirely upon his own staff. From the first the tramways power-station was also kept going with the department's own employees. By December 16 the prospect of a wageless week end proved sufficient to induce even the tramway men acting as pickets to desert their posts, and on the following day the workmen's car service was restored. On December 17, at a special meeting of the City Council, which lasted only five minutes, the Corporation delegated all matters arising out of, or in connection with, the strike to a committee consisting of five aldermen, including Alderman C. H. Wilson, chairman of the Finance and Parliamentary Committee, and leader of the Conservative party in the Council, and Alderman R. A. Smithson, chairman of the Tramways Committee. This body, the same evening, issued a statement instructing the chief officers of departments to receive up to 6-30 p.m. on December 19, applications from strikers for reinstatement. Nearly 80 tramway men returned at once, and on the next day the remainder passed a resolution offering to resume work if they were accepted in a body. Mr. Hamilton's reply to this was that the men would be reinstated as quickly as opportunity offered. In the gas department, the strike, on the part of some of the men, was protracted until December 29, but a number were still standing out in the early part of January.

LONDON.

Suggestions for Meeting Competition—Linking-up Projects for 1915—Additional Trail Cars.

It was suggested at a meeting of the London County Council on December 9, that the Highways Committee should consider the question of penny return fares and also report on the feasibility of a universal penny fare. Mr. Hume, vice-chairman of the committee, replied that revision of the fare stages was being considered, but a

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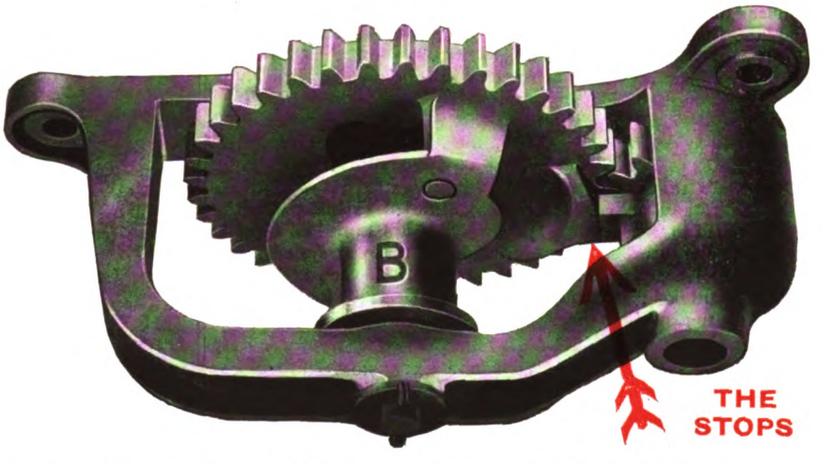

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universal penny fare had not been dealt with. The committee were doing their best to deal with competition, and he asked members not to press on them too strongly new points, because they must have time to see the effect of the alterations already made.—About the middle of February next the Highways Committee expect to be able to present a report recommending a scheme for linking-up existing dead-end termini and otherwise consolidating the tramways, with a view to improving the flexibility and usefulness of the system, to meet competition on more equitable terms, to facilitate further through running arrangements, and so make it easier to reduce the overcrowding together of cars on certain lines.—The Council, on December 16, reported that application had been made for the Board of Trade's consent to the running of 150 additional trail cars on certain of the tramways south of the Thames. Two hundred cars are to be equipped with couplers for that purpose.—Subject to the sanction of the police, the upper saloon decks of 37 cars on the Hammersmith routes are to be provided with automatic sweetmeat machines by a contractor who will pay £2 10s. a year per car.

NOTTINGHAM.

LINKING UP OF THE CITY AND COUNTY SYSTEMS.

Major Pringle, of the Board of Trade, on January 1 inspected the final section of the Ripley to Basford tramway route, which now links up with the lines of the Nottingham City Tramways in Church Street, Basford. The cars of the Nottinghamshire and Derbyshire Tramways Company now run to the junction of Derby Road and Parliament Street. The full distance to Ripley is 13 miles. Major Pringle also inspected the extension of the Carlton Road route to the city boundary. An extension to Carlton will shortly be made, and in the near future the city lines will be extended to Wollaton Lodge and Daybrook.

OLDHAM.

A CASE FOR P-A-Y-E CARS—EFFECT OF THE TIME TABLE ON RECEIPTS—ROSETTES IN PLACE OF STANDARDS.

In the course of a discussion at a December meeting of the Tramways Committee on the stopping of cars by inside passengers when the conductor was on top collecting fares, Councillor Elliot referred to the number of fares missed on Saturdays. They did not, he said, collect the fares they were entitled to on the football cars. The Chairman: We ought to have the P-A-Y-E cars for football traffic. Mr. Dugdale (the manager): There are people who set out to cheat us. Councillor Elliot: And they boast about it. Mr. Dugdale: They would do it if you had trolley boys. The matter was left with the manager.—The manager reported that the receipts for a recent fortnight were £300 more than for the corresponding period last year, and that now their cars ran to a time table they were getting traffic which they did not obtain before.—In order to remove the tramway standards from the centre of Union Street, Oldham, the manager has been negotiating with the owners of properties to permit rosettes to be affixed to their premises. As most of them refuse he has obtained the consent of the committee to give an object lesson by removing the standards at the Clegg Street corner and the one opposite the Technical School.

SOUTHEND.

SEPARATE TRACK ON A 100-FT. ROAD—OPEN CARS—GENERATING STATION EXTENSION.

To connect the new residential seaside district of Thorpe Bay with Southend, the Corporation have constructed a new road 100 ft. wide. Half of it is used as a carriage drive, and on the other half an extension of the tramway system is being constructed on sleepers. The tramway will be enclosed on each side by a shrubbery.—The Light Railways Committee have decided to obtain three single-deck open cars, which could be covered in during inclement weather, for use in connection with the extensions to Bourne Green and Thorpe Hall Avenue. The committee believe that the cars will gain much extra traffic in the summer.—The Council have adopted a scheme of extensions and doubling estimated to cost about £15,000. Rails are to be laid along the new loading pier in order to join up with the tramway system for the conveyance of coal to the generating station. £60,000 is to be borrowed for additional plant required to meet the demands for current from private consumers.

WALLASEY.

DOUBLING OF ROUTES—WORKSHOP EXTENSION.

Owing to the delay caused to the cars by single line tracks with loops on several important routes, the tramways committee have adopted a scheme for doubling the lines, and the work on the Seabank Road section is in progress. A sum of £10,000 is to be expended on an extension of the workshops.

WALSALL.

THIRD-PARTY INSURANCE.

Walsall Tramways Committee have reported their recession of a resolution deciding that on the expiration of the existing tramway indemnity policy the Council should bear the risk of claims. The committee have accepted the offer of the Ocean Accident and Guarantee Corporation, Limited, to insure them against third-party claims for a period of five years on terms considerably more favourable to the Council than those of the existing policy.

PATENT LIST.

Specially abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given below in italics.

APPLICATIONS.

Applications for Letters Patent have been filed:

27,596 Trolley wheel—A. E. Lineberg.
27,603 Buffer stops—L. W. Williams.
27,607 Sliding leverage automatic system for regulating locomotive traffic—E. W. Simmons.
27,610 Means for absorbing excessive shock due to collision in railway vehicles—J. J. Daniels.
27,631 Automatic train control—A. Lench (*T. Lench*).
27,635 Safety apparatus for use on railways—J. McKane.
27,640 Rail splices—W. Slater.
27,713 Railway signalling and brake appliance—F. B. Crosby.
27,826 Life-guard for motor omnibuses—H. A. Hench.
27,828 Built-up iron railway sleepers—M. Matthaei.
27,923 Brake shoes—J. Cook.
27,928 Railway ties and rail chairs—C. A. Allison (*Steel Railway Tie and Appliance Company*).
28,006 Electric signalling system for railways—C. C. Wilson.
28,007 Automatic signalling devices for railways—C. Pinfield.
28,080 Automatic train or vehicle braking—C. W. Prescott and W. L. Shand.
28,200 Emergency signals on railways—L. W. Williams.
28,279 Brake mechanism—F. H. Royce and Rolls-Royce, Limited.
28,431 Life-guards—W. Brookes.
28,512 Signalling apparatus for railways—W. A. Minchin.
28,642 Life-guards for motor omnibuses—H. V. N. Gravely.
28,665 Chair for railway rails—A. J. Block and J. Wilson.
28,666 Air-pressure brakes—Geb. Korting Akt.-Ges.
28,674 Ticket delivering, punching, and checking device for use on tramcars—A. Westensee.
28,691 Suspension devices for brake blocks—J. E. Anger.
28,703 Automatic control system for electric railways—B. J. Hutches, junr.
28,739 and 28,740 Automatic car couplers—J. Willison.

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28,793 Motor omnibuses—J. Graham and H. H. Fyfe.
28,821 Automatic car couplers—J. Willison.
28,905 Suspended vehicle transmission systems—J. P. Roe.
28,977 Electric signalling and train control systems—W. J. Mackenzie.
28,982 Gripping device for use with cable tramways—J. W. White.
29,208 Fish joints for railways—J. A. Nielsen.
29,260 Electrically-insulated fish joints for railway rails—W. R Sykes Interlocking Signal Company, Limited, and G. H. Sykes.
29,318 Brake apparatus for railway vehicles—F. Spencer.
29,334 Means for joining the ends of tramway rails—G. Hughes (*E. H. Underwood*).

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29,378 Life-saving device for motor omnibuses—W. H. Grimsdale.
29,380 Tramway rails—T. E. Mansfield.
29,400 Braking devices for railways—G. Antrig.
29,430 Manufacture of rails—F. Melaun.
29,435 Axle boxes—J. M. Lassmann.
29,579 Device for holding change for coins, especially applicable to tramway, omnibus, or railway services—R. S. Pilcher.
29,752 Electric motor control systems for trains—British Thomson-Houston Company, Limited (*General Electric Company*).
29,759 Electric railway and electric motor control systems—K. E. Stuart.
29,886 Railway-car trucks—W. H. Armstrong.
29,894 Brake mechanism—M. F. Torazzi.
29,962 Railway brakes—S. Cheney.
29,996 Vehicles fenders—H. Lynn and H. Hanause.
30,031 System of railway traffic control—H. A. Thompson.
30,045 Means for suspending overhead conductors or contact wires—Siemens-Schuckertwerke G.m.b.H.
30,061 Machine for issuing tickets upon tramcars—J. B. Harvey.

1914.

21 Railway vehicles—H. N. Gresley.
163 Wind screen for tramcars—F. J. S. Hosken.
208 Life-saving device for electric tramways—J. Gyarmati, I. Laky, and J. Laszlo.

Specifications Published.

1912.

26,174 Axle trucks for railway and tramway vehicles—Peckham.
26,353 Vacuum brake apparatus—Warner.
28,819 Seats for railway and tramway vehicles—G. D. Peters and Company, and Roberts.
26,412 Running gear for self-propelled and other rail vehicles—Murgatroyd.
27,379 Car journal boxes—Berry.
28,120 Life-guards—Holman and Mann.
29,342 Brakes for railway and tramway vehicles—Bowers.

1913.

3,704 Resilient metallic keys for the chairs of pemanent way—Minnitt.
4,840 Apparatus for automatically taking up the slack in the brakes of tramcars—Anger.
20,296 Brake shoes—Fisher.
1,003 Wheels for motor omnibuses—Statham.
8,127 Concrete railroad cross tie—Rosencrans and Sanderson.
10,039 Reinforced-concrete railway sleepers—Wetzer.
11,594 Rail joints—McHale.
17,088 Brake mechanism for railway and tranway vehicles—Brooks.
2,804 Trucks for self-propelled vehicles—British Thomson-Houston Company (*General Electric Company*).
2,835 Life-guards for motor omnibuses—White and Peck.
8,052 Axle-boxes for tramway and railway vehicles—Delmez.
14,020 Double-decked cars for railways and tramways—Spangler.
16,861 Automatic brake mechanism—Jacoubof.
9,652 Brake mechanism—Albanese.
22,020 Brake mechanism—Royce and Rolls-Royce, Limited.
25,679 Railway chairs and chair keys—Imray (*Stephenson*).

TRAFFIC RETURNS.

Colonial and Foreign Tramways.

NAME OF COMPANY.	1912. WEEKS ENDING. Dec. 7.	Dec. 14.	Dec. 21.	Dec. 28.	1913. WEEKS ENDING. Dec. 6.	Dec. 13.	Dec. 20.	Dec. 27.	AGGREGATE. Wks.	1913.	Increase or Decrease.
	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine	59.056	56.863	57,159	64,790	64,356	61,918	59,432	68,194	52	2,917.249	+209,083
Auckland	...	...	...	...	...	...	...	...	—	—	—
Brazilian Street (month) Mlrs.	44.278	...	...	...	53.642	...	...	...	17	207.214	+ 35,873
Brazilian Traction	84,177	...	...	84.911	95.237	...	...	97.642	—	—	—
Brisbane (month)	24,310	...	...	...	27.053	...	...	...	48	287.071	+ 58.650
British Columbia (month) $	741.876	...	...	...	746,152	...	...	...	22	3.760.507	+283,424
Buenos Aires Port and City (month)	...	..	...	...	...	...	...	...	—	—	—
Buenos Ayres Lacroze (month)	...	...	...	47,188	...	...	...	47.624	26	272.894	+ 9,337
Calcutta Rs.	65.796	64,890	62,610	66,164	68,560	65.644	67,406	70.774	52	33,71.408	+1,60,615
Cape Town (month)	11,267	...	...	...	12.555	...	...	...	—	—	—
Carthagena and Herrerias (month)	...	...	...	3.001	...	...	...	2.698	52	30.863	+ 4,517
Cordoba (month)	12,193	...	...	...	13,447	...	...	...	35	107.457	+ 10,471
East India (month)	1.924	...	...	...	1.922	...	...	...	17	7.833	+ 145
Kalgoorlie (month)	2.861	..	...	...	2,504	...	...	...	48	31.603	- 3,001
La Plata (month)	...	...	...	5.682	...	...	...	5,680	52	61.520	+ 9,344
Lima (month)	...	...	...	..	...	...	...	...	—	—	—
Madras Rs.	(2 weeks) 23.821	(2 weeks)	29.482	...	(2 weeks) 27.079	(2 weeks)	30.800	...	52	644.192	+ 46.109
Melbourne (month)	...	...	...	...	...	...	...	...	—	—	—
Mexico (month) $	565.239	...	...	...	605,467	...	...	...	48	6.337.805	+177,861
Montevideo (month)	...	...	...	34.483	...	...	...	33.309	9	63.839	- 267
Para	4.161	3.910	3.622	4.020	3.501	3.284	3.206	3.365	4	13.356	- 2.357
Port Elizabeth (month)	3.216	...	...	...	3.530	...	...	...	—	—	—
Shanghai $	20.190	20.254	18.598	19.299	22.400	23.600	22.000	22.600	51	1.146.852	+137.570
Singapore $	10.478	10.435	10.380	10.266	11.964	12.008	11,451	11,339	52	620.696	+ 79.648
Toronto (month) $	742.156	...	...	...	849.279	...	...	...	48	8.893.984	+1176.680
Winnipeg (month) $	345.091	...	...	...	360.082	...	...	...	48	3.698.831	+295.148

(*Continued on page 54.*)

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TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1912. WEEKS ENDING.				1913. WEEKS ENDING.				AGGREGATE.		
	Dec. 7.	Dec. 14.	Dec. 21.	Dec. 28.	Dec. 6.	Dec. 13.	Dec. 20.	Dec. 27.	Wks.	1913.	Increase or Decrease.
	£	£	£	£	£	£	£	£		£	£
Aberdeen Corporation	1,355	1,381	1,315	1,488	1,558	1,415	1,459	1,499	30	49,052	+ 3,112
Accrington Corporation	493	507	548	639	560	540	572	633	38	22,154	+ 2,000
Ayr Corporation	188	200	202	210	239	236	236	244	32	13,193	+ 1,894
Bath Electric	639	677	697	903	741	721	730	885	52	49,319	+ 3,865
Birkenhead Corporation	1,136	1,174	1,234	1,219	1,206	1,259	1,295	1,330	39	50,641	+ 4,851
Birmingham Corporation	11,310	11,591	11,976	12,455	12,612	12,519	12,817	13,258	39	462,341	+ 40,129
Blackburn Corporation	1,047	1,120	1,100	1,367	1,172	1,186	1,169	1,399	39	51,674	+ 4,760
Blackpool Corporation	500	439	440	600	644	468	459	595	38	76,193	+ 12,113
Bolton Corporation	2,465	2,540	2,568	2,782	2,581	2,711	2,572	2,829	39	107,070	+ 6,102
Bournemouth Corporation	1,453	1,550	1,695	1,783	1,616	1,626	1,790	1,681	39	84,008	+ 9,476
Bradford Corporation	5,083	5,486	5,784	6,130	5,586	5,994	5,481	6,268	38	232,049	+ 13,975
Brighton Corporation	784	794	856	980	828	821	830	1,019	39	44,095	+ 3,003
Bristol	6,432	6,774	7,405	8,845	7,517	6,923	7,396	9,347	51	413,240	+ 53,019
British Electrical Federation	36,835	38,551	38,570	43,756	45,007	44,325	45,338	51,211	—	—	—
Burnley Corporation	1,423	1,553	1,547	1,762	1,566	1,633	1,546	2,024	39	66,929	+ 7,582
Burton-on-Trent Corporation	255	270	276	323	280	292	288	336	39	11,600	+ 587
Bury Corporation	1,229	1,227	1,243	1,419	1,288	1,255	1,250	1,427	39	53,065	+ 2,161
Cardiff Corporation	2,343	2,519	2,577	..	2,652	2,632	2,606	..	38	104,234	+ 10,972
Chatham and District	758	818	847	977	867	850	872	940	51	47,453	+ 2,947
Chesterfield Corporation	229	237	238	300	258	248	251	301	38	10,058	+ 1,167
Colne and Trawden	237	252	235	286	244	237	239	291	52	14,178	+ 817
Cork Electric	420	449	463	537	480	474	445	514	51	25,640	+ 700
Croydon Corporation	1,619	1,706	1,720	1,930	1,566	1,542	1,634	1,904	38	64,477	- 6,034
Darlington Corporation	217	221	236	264	238	231	248	283	39	9,770	+ 923
Derby Corporation	868	878	948	1,059	923	898	963	1,053	39	38,583	+ 3,703
Dover Corporation	186	189	206	222	180	182	194	210	39	9,859	+ 166
Dublin and Lucan	111	109	116	253	119	118	121	267	26	3,859	- 13
Dublin United	5,250	5,578	5,812	6,142	4,955	5,161	5,298	5,582	51	281,254	- 17,369
Dundee City	1,125	1,144	1,186	1,284	1,307	1,208	1,266	1,346	32	42,197	+ 3,225
East Ham Corporation	1,020	1,051	1,075	1,259	1,036	998	1,054	1,127	39	40,169	- 1,802
Exeter Corporation	266	291	295	356	304	300	302	343	39	13,580	+ 672
Gearless Motor 'Buses	..	..	..	..	461	492	462	394	38	18,800	-
Glasgow Corporation	18,582	19,317	19,319	20,021	20,759	20,643	20,879	21,061	30	611,247	+ 45,944
Glossop (Urban Elec. Supply Co.)	120	127	129	139	117	118	116	138	52	6,707	+ 572
Halifax Corporation	1,694	1,838	1,816	2,160	1,960	1,840	1,865	2,001	38	81,467	+ 2,735
Hastings and District	659	684	712	904	741	719	742	859	52	53,215	+ 3,800
Huddersfield Corporation	1,933	2,015	2,078	2,483	2,020	1,990	2,013	2,479	39	83,515	+ 4,655
Hull Corporation	3,003	3,101	3,208	3,474	3,202	3,121	3,234	3,495	39	123,040	+ 6,332
Ilford U.D. Council	402	417	442	538	464	419	431	515	39	17,735	- 903
Ilkeston Corporation	112	113	121	123	121	122	147	122	40	5,334	+ 805
Ipswich Corporation	346	371	421	473	375	368	411	444	39	18,280	+ 734
Isle of Thanet	263	276	292	355	290	294	293	374	13	4,776	+ 503
Kilmarnock Corporation	146	160	155	167	165	162	158	174	32	5,702	+ 387
Lanarkshire	1,425	1,531	1,508	1,566	1,821	1,731	1,773	1,762	51	88,204	+ 11,528
Lancashire United	1,238	1,293	1,321	1,509	1,610	1,484	1,529	1,594	51	79,876	+ 10,023
Leeds City	7,499	7,752	8,009	8,758	8,070	(Strike)	..	..	36	298,887	+ 19,202
Leicester Corporation	2,670	2,675	2,768	3,112	2,770	2,729	2,835	3,086	52	145,942	+ 12,600
Leith Corporation	590	619	611	675	645	638	642	668	32	23,108	+ 1,110
Leyton U. D. Council	1,183	1,231	1,270	1,436	1,289	1,254	1,294	1,432	38½	52,118	- 383
Liverpool Corporation	11,947	12,619	13,207	13,258	12,880	13,091	13,416	14,097	52	670,292	+ 49,018
Llandudno and Colwyn Bay	101	133	137	206	107	144	142	174	4	567	- 10
London County Council	40,069	41,904	42,618	45,036	42,479	42,752	43,151	46,553	38	1,623,057	+ 7,035
London General Omnibus	55,107	57,308	60,392	52,607	58,958	60,161	61,588	54,078	52	3,204,390	+514,983
London United	5,239	5,511	5,646	6,806	5,707	5,536	5,709	6,799	52	325,298	+ 6,772
Lowestoft Corporation	154	176	176	187	183	159	199	196	12	2,433	+ 187
Maidstone Corporation	147	158	161	224	183	170	174	213	39	8,085	+ 574
Manchester Corporation	16,455	17,084	17,593	17,278	17,363	17,617	17,679	17,114	39	687,352	+ 32,810
Metro. Electric Tramways	8,035	8,629	8,813	10,375	8,608	8,573	8,697	10,231	52	469,392	+ 15,235
Nelson Corporation	174	193	184	214	183	176	191	225	39	8,226	+ 456
Newcastle-on-Tyne Corporation	4,520	5,081	4,822	5,055	4,941	4,971	5,195	5,543	39	191,633	+ 17,392
Newport (Mon.) Corporation	678	751	727	863	760	756	744	903	39	30,224	+ 2,398
New St. Helens and District	664	713	704	846	777	769	736	853	26	21,717	+ 2,216
Northampton Corporation	465	492	503	655	536	515	531	623	39	22,608	+ 1,459
Nottingham Corporation	3,042	3,182	3,132	3,286	3,312	3,256	3,187	3,175	38½	129,646	+ 5,723
Oldham Corporation	1,954	1,979	2,045	2,275	2,151	2,163	2,179	2,431	40	88,813	+ 6,430
Portsmouth Corporation	1,647	1,755	1,877	1,769	1,919	1,957	1,958	1,926	39	90,490	+ 6,475
Preston Corporation	740	768	799	927	825	796	792	931	39	34,583	+ 2,170
Provincial	1,512	1,602	1,723	1,815	1,644	1,703	1,767	1,941	12	22,073	+ 1,539
Reading Corporation	571	648	648	781	652	662	660	803	38	27,129	+ 2,087
Rochdale Corporation	1,382	1,451	1,506	1,736	1,458	1,472	1,506	1,782	39	63,072	+ 2,698
Rotherham Corporation	878	870	1,008	1,175	958	1,004	1,150	1,172	39	39,891	+ 8,584
Salford Corporation	4,958	5,022	4,181	4,874	5,143	5,262	5,155	5,187	39	205,245	+ 9,661
Sheffield Corporation	7,104	7,226	7,242	8,291	7,335	7,526	7,455	8,321	40	293,203	+ 22,909
Southampton Corporation	1,048	1,118	1,143	1,251	1,234	1,199	1,180	1,445	38	51,708	+ 3,386
Southend-on-Sea Corporation	514	533	560	609	674	650	662	817	39	38,056	+ 6,731
South Metro. Tramways	704	752	799	1,021	1,040	1,050	1,079	1,265	52	49,743	+ 6,204
South Shields Corporation	582	641	624	752	662	653	715	809	39	28,272	+ 3,406
Sunderland Corporation	1,265	1,256	1,363	1,560	1,333	1,345	1,399	1,592	39	56,783	+ 5,433
Swindon Corporation	134	151	154	212	153	157	151	202	38	6,470	+ 414
Tramways (M.E.T.) Omnibus Co.	..	..	..	..	8,177	8,755	8,987	8,052	48	274,252	—
Tyneside Tramways and Tramroads	417	638	400	540	470	446	476	536	26	13,451	+ 519
Wallasey Corporation	967	1,026	1,077	1,077	1,098	1,089	1,123	1,170	39	48,060	+ 4,449
Walsall Corporation	585	611	619	849	628	631	634	899	52	32,711	+ 2,309
Walthamstow U.D. Council	615	641	676	832	712	700	724	906	39	29,401	+ 1,114
Warrington Corporation	431	455	456	523	454	447	435	460	39	17,269	+ 479
West Ham Corporation	2,458	2,558	2,692	3,040	2,694	2,648	2,694	3,061	38½	105,547	+ 4,013
Wigan Corporation	1,311	1,391	1,438	1,625	1,515	1,460	1,489	1,692	38½	57,773	+ 5,589
Wolverhampton Corporation	1,044	1,032	1,129	1,305	1,044	1,068	1,292	1,166	40	43,252	+ 2,277
Yorkshire (West Riding)	1,255	1,257	1,340	1,838	1,333	1,293	1,240	1,846	52	75,333	+ 7,336

Electric Railways.

NAME OF COMPANY.											
Central London	5,624	5,795	5,969	4,407	5,405	5,370	5,539	4,481	52	254,195	+ 4,322
City and South London	3,056	3,227	3,225	3,466	2,836	2,918	2,870	2,878	52	144,932	- 14,184
Liverpool Overhead	1,587	1,595	1,628	1,500	1,618	1,742	1,760	1,533	52	88,979	+ 6,645
London Electric	14,480	14,890	14,975	13,460	14,725	14,820	14,725	13,780	52	711,595	+ 970
Mersey	2,222	2,223	2,413	2,317	2,119	2,186	2,320	2,305	52	116,063	+ 4,457
Metropolitan	16,660	17,008	17,364	17,484	18,278	18,346	18,673	19,184	52	902,258	+ 35,507
Metropolitan District	12,818	13,107	13,167	12,200	13,020	13,432	13,282	12,705	52	675,747	+ 18,890

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TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officals and the principal particulars relating to each undertaking.

The directory is revised as occasion requires, and is the most up-to-date and comprehensive list published.

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AND

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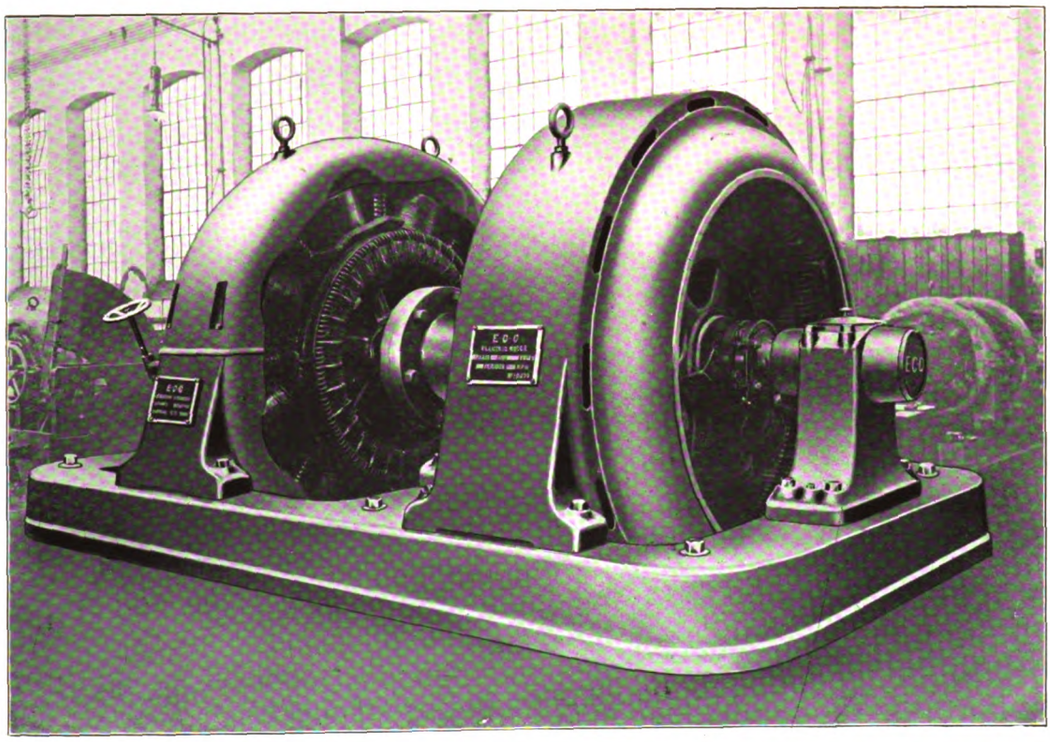
OF EVERY DESCRIPTION.



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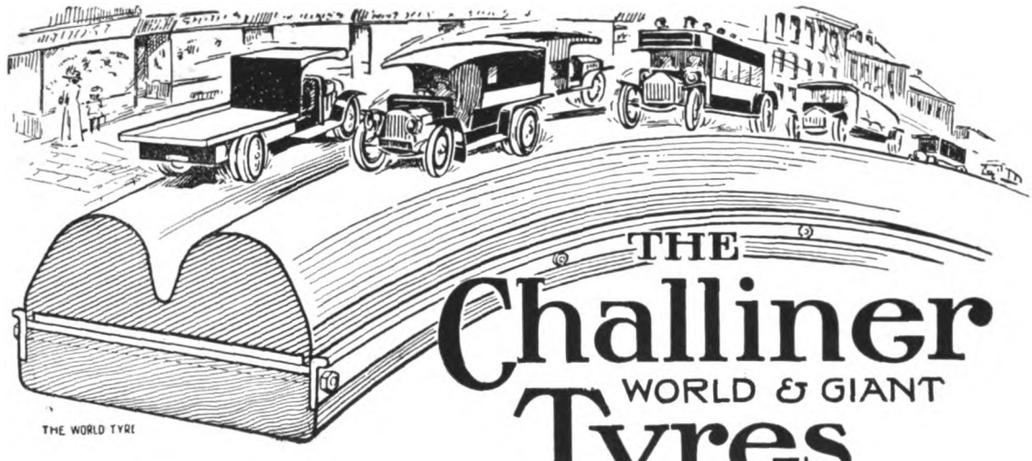

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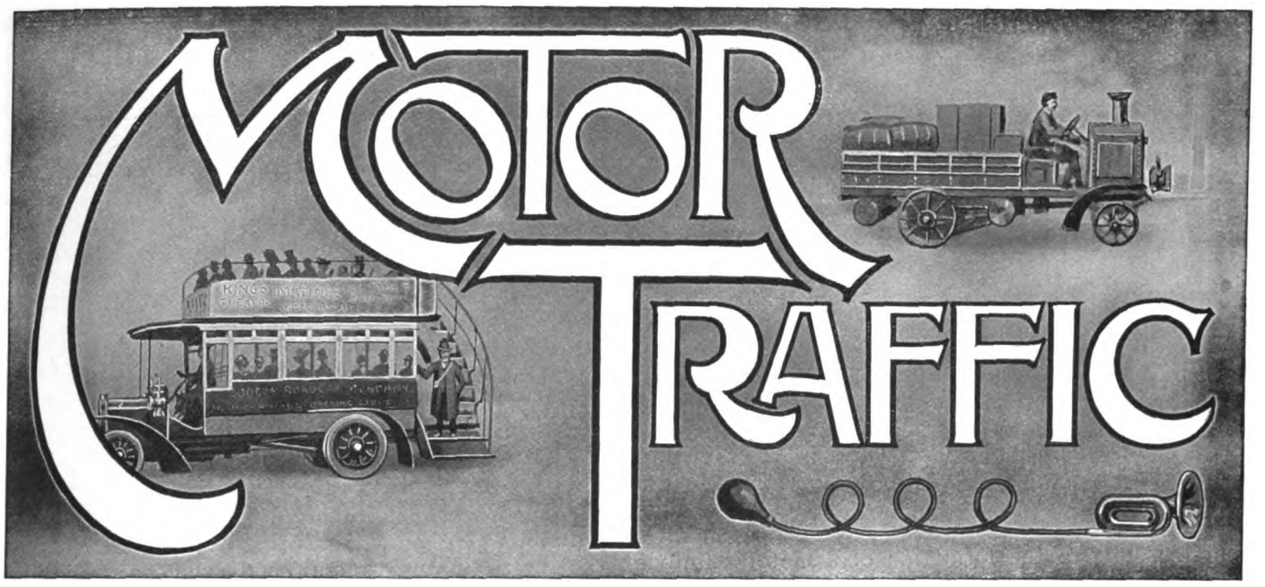

Apart from the development of omnibus traffic by municipal tramway undertakings, the year 1913 will be memorable in the annals of motor traction for the none too rapid awakening of tramway companies to the possibilities of the road motor as a dividend-earning factor. This quickening of enterprise relates not only to passenger carrying but also to the transport of goods, which is a new departure. Nevertheless, in these days of congested goods traffic and frequent strikes on the railways it is an appropriate innovation, and, as the companies are privately owned, the new class of business can be taken up without arousing the opposition that is bound to follow similar proposals on the part of municipalities, at least if it is desired to carry general merchandise and parcels. This, at any rate, seems to be the inference to be drawn from the refusal of Parliament in 1906 to allow the Manchester Corporation Tramways to compete with private enterprise by carrying parcels in vehicles other than tramcars. The carriage of goods and parcels by tramway companies is facilitated by the fact that they are not obliged to secure Parliamentary powers. All that is necessary is that a separate company should be formed. In this manner the Gateshead, Jarrow, and Tynemouth Tramways Companies have formed the Northern General Transport Company, Limited, for the object, among others, of carrying on and developing in the northern counties transport business in all its branches, including the carriage of passengers and goods by motor vehicles, and of securing interests in undertakings at present engaged in such work.

What the shareholders think of the proposal is shown by an intimation made during the second week in January, that holders of 86 per cent. of the share capital of the Gateshead Company, 68 per cent. of the share capital of the Tynemouth Company, and 98 per cent. of the share capital of the Jarrow Company have accepted the offer of an exchange of shares made by the Northern Transport Company. Consequently the offer for the transfer of the three undertakings to the last named has become binding. The development is most opportune, for there are London and other motor vehicle syndicates prospecting for openings in the provinces. Such business can be more fittingly undertaken by local effort, and if the three companies had not taken action at this juncture there is the possibility that at no distant date they would have had to encounter enterprises that would seriously compete with the tramways. Proof of this has been given elsewhere by the action of the Kidderminster Council in licensing an outside motor company in order to set up competition, even though the tramway company offered to provide motor services. An undertaking on somewhat similar lines to the Northern General Transport Company has also been started somewhat late in the day in connection with the Greenock and Port Glasgow, Airdrie and Coatbridge, and Rothesay Tramway Companies. It is to be known as the Scottish General Transport Company, whose mission will be to prepare for future developments. In this case the three companies are already contending with omnibus competition.

At least one other district may be mentioned in which a tramway company has to face serious rivalry from motor vehicles. It is the Blackpool, St. Anne's, and Lytham Tramways Company, whose affairs were shown at the recent annual meeting to be far from satisfactory from a financial standpoint. The chairman mentioned that in one week last June 100 motor chars-a-bancs were counted passing the depot for St. Anne's and Lytham, taking part of the company's traffic and more or less damaging the track the company have to maintain. Enlightenment as to the reason for this preference for using tramway tracks was given in the course of the discussion on a paper on road construction, read before the Manchester Society of Engineers by the consulting engineer to the Road Board, when a speaker mentioned that the drivers of motor vehicles would deliberately leave a good paved road and run on the tramway track because the rails offered the least resistance to their vehicles. These chars-a-bancs, the chairman of the Blackpool company added, were a most popular means of travelling, and as they are bound to increase in number there must be a curtailing of the receipts of tramway companies. The company have taken steps to meet this competition, for in August last they purchased a char-a-bancs at a cost of £850, and used it for running long distance trips from St. Anne's to Southport, the Lakes, Morecambe, and other places. The account given of the results of these excursions was that they were very popular and satisfactory financially. This should induce the company to extend their operations by obtaining additional vehicles. As Mr. Nicholson stated that the existing machine is not used for the local service, this is clearly an instance in which the management would be well advised to consider the

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MOTOR TRAFFIC.

possibility of running motor conveyances as feeders to the tramways. It is satisfactory to observe that the chairman announced that the management intend to extend the char-a-bancs service as far as possible, and that the board are considering the question of obtaining additional powers in regard to motor vehicles.

While it is useless to lament the difficulties in which road motors have involved tramways in other provincial centres, a useful purpose may be served by pointing out that tramway undertakings can no longer afford to ignore competition. The Cambridge horse tramways company are threatened with liquidation by the demand of the Corporation for arrears of money due for the maintenance of their track. The company's trouble is due to the formation of a motor omnibus company some years ago, an enterprise that ought to have been inaugurated by the Tramway Company. At Oxford the horse-drawn cars have suddenly encountered opposition as the result of local enterprise in placing omnibuses on the streets without a licence. Permission has now been granted to three applicants to run omnibuses, including the company who have undertaken to electrify the tramways, a task that will now be rendered difficult of achievement, involving as it does self-propelled cars for the chief thoroughfares, and the overhead system in other districts. A remarkable contrast to the position of affairs in the university towns is the action of the Birmingham Corporation tramways department. On January 7 the City Council adopted the Tramways Committee's proposal to purchase the undertaking of the Motor Omnibus Company within the city, while allowing the company to run their vehicles at double fares on the outward journey over tramway routes in order to link up the services which they are providing to distant towns. Already these omnibus services have been shown to bring traffic to the tramways. That being so, it is disappointing to find that the Council have decided not to permit the omnibuses when running inwards to take up passengers inside the city boundaries. Than this restriction there could not be a better testimonial to the value of the omnibus, and manufacturers should not fail to utilise it in their advertisements.

Birmingham's experience should prove an encouragement to several Corporations which during the past few weeks have granted licences to omnibus companies to use tramway routes in connection with their services to places outside the boundaries. A conspicuous example of this broad-mindedness has to be credited to Maidstone, where on December 31 the municipal authority granted licences for ten vehicles to Thomas Tilling, Limited, on condition that in cases where it is necessary to begin or finish journeys by running over portions of tramway routes, the fares are to be at least as high as the tramway charges, the minimum to be threepence within the tramway route. The Brighton Council have also permitted two omnibuses to run over the Lewes Road tramways in continuation of a six-mile service to Lewes, the minimum fare in the borough to be threepence. Several members endeavoured to secure the deletion of the Watch Committee's recommendation on the ground that it should have been forwarded to the Tramway Committee for consideration. At Birmingham the two committees acted in concert, and if only for the sake of securing harmony such procedure is to be commended. By a large majority the Brighton Corporation approved of granting the licences, several members welcoming the innovation, on the grounds that competition with the railway company is necessary, and that the omnibuses would bring in trade from the outside districts. In Luton, where a tramway company operates, the Town Council have granted facilities to the Bedford omnibuses of the New Central Company (now amalgamated with the London General Omnibus Company) to run into Luton as far as Manchester Square, with a minimum fare of twopence within the town.

A record year is reported by the London General Omnibus Company for 1913. Within a few days of the end of the twelve months, the wide-awake publicity department at Electric Railway House advertised in the newspapers a statement that at the close of 1912 there were 82 services working daily, while on December 31, 1913, the daily services numbered 103. In 1912 the number of passengers was 493 millions, and in the past year 675 millions of passengers were carried. The details as to gross and net profits will, of course, be reserved for the annual report, but so vast an increase as 182 millions of passengers, despite the reduction of fares on the County Council's tramways, shows that the larger number of vehicles working have filled a public want. Doubtless there will be a proportionate increase in the profits, although the tramways are now securing increased instead of decreased receipts as compared with the corresponding period of the previous year. For the 37 weeks to December 24 of the tramway year the receipts are higher by £7,035 than for the same period in 1912, when the competition was lowering the income every week. For the company's year ended December 27 the takings were £3,204,390, which gives the handsome addition of £514,983.

NORTH OF ENGLAND EXHIBITION.

Following an exhibition of pleasure cars in the City Hall, Deansgate, Manchester, a show of commercial and industrial vehicles opens in the same hall on January 30, under the auspices of the Society of Motor Manufacturers and Traders. It will be open until February 7. All the well-known makers will be represented, including the Albion Company, Limited, Argylls, Limited, British Berna Motor Lorries, Limited, Daimler Company, Limited, Dennis Bros., Halleys, Limited, Leyland Motors, Limited, W. A. Stevens, Limited, Sydney Straker and Squire, Limited, and Thornycroft, Limited. Tyre and accessory makers will include The Avon India Rubber Company, J. W. and T. Connolly, Continental Tyre and Rubber Company, Coventry Chain Company, Dunlop Rubber Company, Peter Union Tyre Company, Shrewsbury and Challiner Tyre Company, etc.

Repair of Solid Tyres.—In view of the great and continued advance of the commercial motor vehicle the announcement by the Continental Tyre Company, 3 and 4, Thurloe Place, South Kensington, S.W.—makers of the famous "T" pattern solid band tyre—that they can carry out repairs to solid tyres owing to extensions to their repairing plants will be heartily welcomed. The importance of this development, which is the result of investigation and careful experiment, cannot be overrated. Solid tyres frequently suffer serious injury in the course of work, and owners have had to bear the heavy expense of early replacement, whereas now, at a comparatively trifling cost, they can have their injured tyres restored to normal condition, and made as fit for further use as when they were new. This is, of course, provided the damage to the tyre is not so vital as to render repair hopelessly impracticable. Particulars and estimates for repairs will gladly be supplied by the Continental Tyre Company.

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MOTOR TRAFFIC.

THE FIRST DOUBLE-DECK RAILLESS CAR.

The first double-deck railless electric omnibus placed in service in this or any other country is shown in the photograph reproduced below. It has been constructed by the R.E.T. Construction Company, Limited, by whom it has been lent to the Brighton Corporation, and it is being used by the tramways department for the purpose of demonstration. The vehicle was photographed at Brighton for THE TRAMWAY AND RAILWAY WORLD, and the manager of the Corporation tramways is seen seated at the wheel. While it would be premature to make any statement as to the intention of the Corporation, the vehicle has been designed in accordance with the general plan, although not to the exact dimensions, which it is understood may ultimately be adopted.

The car provides seats for 40 passengers. It is very lightly sprung, and is fitted with hydraulic suspensions, giving very easy riding. It is equipped with two electric motors, each with an independent transmission gear. A high average speed can be maintained, and all the controlling apparatus is easy of manipulation, the whole vehicle being more like a private car in this respect than the usual type of omnibus. The chassis is one of the older type of the R.E.T. cars, and does not, therefore, contain the all-worm drive, or chainless transmission, which is an important feature in the company's later type of vehicles. Indeed, very notable advances have been made since the construction of the chassis of the vehicle shown in the illustration. It will be seen that the trolley standards are placed at the rear of the vehicle, and the patented trolley of the R.E.T. Construction Company enables the car to make very large deviations, whatever the rate of speed may be. The driver thus has full control of the whole width of the road at all speeds.

For demonstration purposes a section of Preston Road has been equipped with overhead wires at a cost of £115, and this will be available up to January 19, when the thoroughfare will be closed in order to permit the relaying of the tramway track and wood paving, but the Tramways Committee consider that the interval will be amply sufficient for a demonstration of the capabilities of the car. The vehicle has also been given several runs on the ordinary tramway routes, and on January 6 it was inspected by members of Hove Corporation. Mr. Munro, of the R.E.T. Construction Company, who is the designer of the car, was also present.

The demonstration was decided upon in order to comply with a suggestion made by the Hove Town Council, in whose territory, as well as Brighton, the railless car scheme devised for the Brighton Corporation by Mr. J. B. Hamilton, is to be installed. The chief through route will traverse the principal business thoroughfares both of Brighton and Hove. These are narrow, particularly in Brighton, and it is on that account that the Brighton Corporation have not installed tramways. In respect to the heavy traffic on the route and the importance of the streets, the scheme will be unique in this country. North Street, one of the Brighton thoroughfares to be dealt with, has a considerable gradient, and there is a sharp double turning at the junction of North Street and Western Road. A great portion of the latter street is only wide enough for vehicles to pass each way.

The passenger traffic, both on the Brighton and Hove portions of the route, has for some years been dealt with by motor vehicles of the local omnibus company, and Mr. Hamilton's scheme provides for the use of motor omnibuses while the installation is being made, and also on other routes. Since the Hove Corporation obtained their bill authorising the installation of their portion of the project, a section of that Council have shown a desire to resort to motor omnibus traction instead, and on this account the Brighton scheme has been considerably delayed. Finally, Brighton agreed to install a demonstration route for the satisfaction of their western neighbours.

The double-deck car has been sanctioned by the Board of Trade, subject to the overall width being reduced to 7 ft., and the body of the vehicle being at least 10 in. above the surface of the road. The Board also state that the sanction will be subject to such special regulations as to speed, stops, passing places, etc., at narrow places as may be found to be necessary when the inspection of the system proper takes place.

Double-Deck Railless Electric Car at Brighton.

ROYAL AUTOMOBILE CLUB.—The Royal Automobile Club Buildings Company have declared a dividend at the rate of 5 per cent. per annum for the period from March 31, 1912, to September 30 last. £1,500 has been placed to the reserve and £1,247 carried forward.

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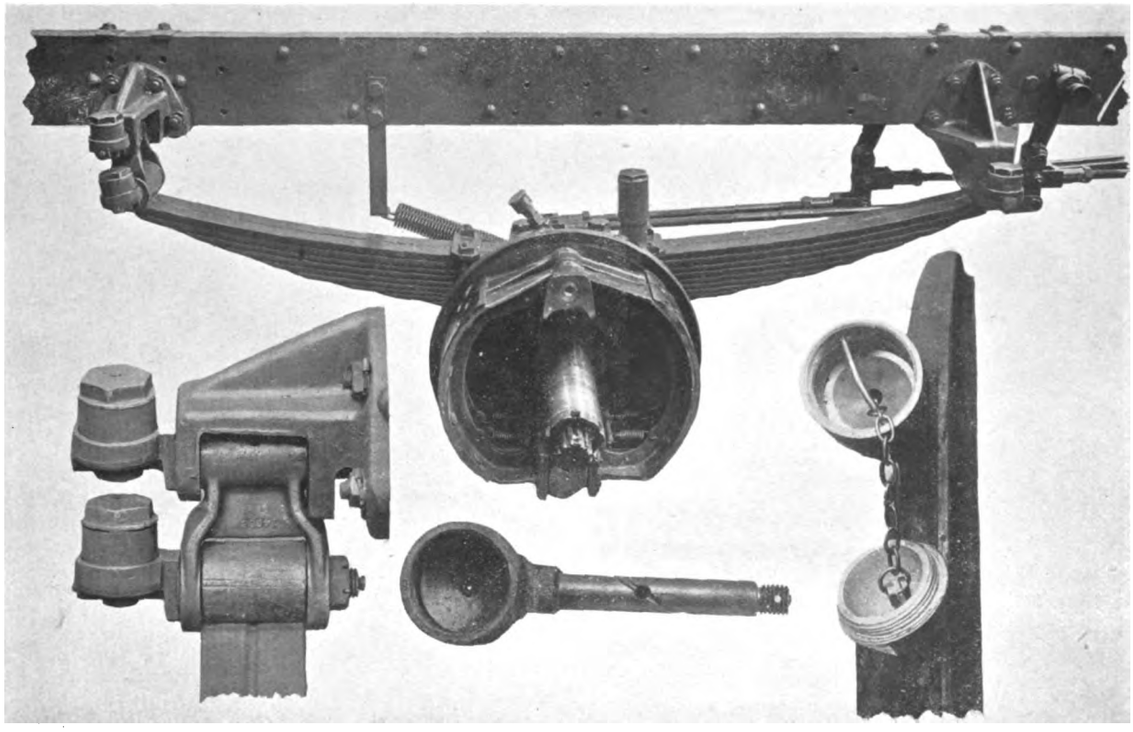
MOTOR TRAFFIC.

DAIMLER REFINEMENTS IN COMMERCIAL VEHICLE DESIGN.

The immense proportions to which the Daimler commercial vehicle business has now grown renders the detail construction of Daimler lorries of interest. The accompanying illustration, which is reproduced from a photograph taken at the Daimler works, illustrates the point, and is well worth notice. Everyone is familiar with the difficulty of satisfactorily lubricating the pins of spring shackles, particularly on freight vehicles, which are subject to very heavy loads, and are very liable to have ordinary screw type greasers damaged or lost in service. It is, in fact, essential that even the smallest parts should be able to withstand rough handling on this class of vehicle, and the lubricators especially, seeing that they are so important to the longevity of the machine.

On the Daimler lorries a unique design of spring shackle lubricator has been devised, and consists of a cup forming an extension of the shackle pin. This cup is designed to contain oil. The bottom of the cup has a hole communicating with the oil-way cup on the surface of the pin, and the hole of the cup is closed by a loose fitting ball. When the vehicle is at rest this ball seals the orifice which retains the oil in the cup. When the vehicle is in motion the vibration from the road sets the ball in slight motion, thus permitting the oil to pass by into the shackle pin. The lid of the cup screws into place and forms an intact joint, so that the oil cannot be spilled. Also, the lid is attached to the cup by a chain, so that it cannot be lost. These cups are of considerable size, although not so large as to be ungainly, and they are thus able to contain a large supply of oil. Furthermore, they have the advantage of being very readily replenished.

The illustration shows one of the rear springs of a Daimler lorry complete and the shackles and construction of the lubricator on a larger scale. The simple ball valve is very clearly indicated in these latter views.



Spring Shackle Lubricator Used on Daimler Lorries.

MORE OMNIBUS LICENCES GRANTED AT OXFORD.—The Corporation on January 7 adopted a recommendation by the Watch Committee to license 24 more vehicles, 12 each to the Tramway Company and the Oxford Motor Omnibus Company. The Mayor, in moving the adoption of the recommendation, thought they had no power to grant a monoply. Mr. Morris, on behalf of the omnibus company, had offered to pay a rent of £800. They were receiving a rent of £800 from the Tramway Company, who were paying rates to the tune of £400, and at the same time were paying for the upkeep of a very large area of roads.

TRAMWAY COMPANIES TO DEVELOP ROAD MOTORS.

Important proposals are contained in letters that have been submitted to the shareholders of the Gateshead, Jarrow, and Tynemouth Tramway Companies. It is stated therein that the Northern General Transport Company, Limited, has been formed for the purpose, among others, of carrying on and developing in the Northern counties transport business in all its branches, including the carriage of passengers and goods by motor vehicles and of acquiring interests and undertakings carrying on such business, and especially with a view to consolidating the interests of these three Tyneside companies.

The Gateshead company have purchased and are operating a number of motor vehicles in connection with their tramway system and also in the area adjacent to the Jarrow company's tramways, while the Tynemouth company have also decided to acquire and work a number of similar vehicles.

Having regard to the proximity of the areas of the three companies concerned, and to the wide range and flexibility of services offered by modern motor vehicles, the development of separate services by the three companies is likely to lead to over-lapping and other difficulties. There is, moreover, a large scope for the development of motor traction both for passengers and goods, but such business to be successfully developed requires further expenditure of capital, expert knowledge, and special organisation, which the Transport Company will be likely to provide.

The Transport Company have an authorised capital of £250,000 in ordinary shares of £1 each, and £150,000 in 6 per cent. preference shares of £1 each, with power to issue debenture stock to an amount not exceeding the issued share capital for the time being. The scheme under which the shares of the various companies will be transferred to the Transport Company is outlined, and if all the issued shares are exchanged the nominal value of the shares and debenture stock to be issued by the Transport Company under the scheme will amount to £254,382 in £1 ordinary shares, £115,871 in 6 per cent. preference shares, and £54,500 in 5 per cent. debenture stock. The company will have sufficient capital remaining available for issue to provide for the further development of the motor transport business. The directors are Mr. C. Shireff Hilton, chairman; Mr. H. S. Day, chairman of the Gateshead Tramways Company; Mr. C. R. Green, chairman of the Tynemouth Tramways Company; Mr. R. J. Howley; and Mr. L. A. Atherley Jones, K.C., recently M.P. for North-West Durham. The scheme for the exchange of shares has become operative.

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STEVENS PETROL-ELECTRIC VEHICLES.

Among the petrol-electric omnibuses which Messrs. W. A. Stevens have recently sent abroad are included one for Pietermaritzburg, and one for the East India Tramways Company, which are shown in the accompanying illustrations. The vehicle supplied to the Pietermaritzburg municipality is fitted with a 20-seated char-a-bancs body and, as will be seen from the illustration, has a fixed canopy. Mr. Finlayson,

40-h.p. Tilling-Stevens Omnibus for Pietermaritzburg Municipality.

general manager of the Pietermaritzburg tramways department, says that the vehicle, which is now in service, is being used for the purpose of opening up new routes in various districts surrounding the town.

The vehicle for the East India Tramways has been specially designed, so far as the body is concerned, to provide seats for a large number of passengers. It is being used in Karachi, where it is proposed to run it, with other vehicles already ordered, to act as feeders to the tramcars.

The Pietermaritzburg vehicle is of the latest Tilling-Stevens type, and has a capacity of 40 H.P., and is similar to those supplied to a number of other municipalities. The East India omnibus is of 30 H.P. capacity, and is similar to those used by Messrs. Tilling in London, and to a few in use in Birmingham.

ELECTRIC VEHICLE COMMITTEE.

At the third meeting of this committee, held at the Institution of Electrical Engineers on December 11, a letter was read from Sir Edward Henry, the Chief Commissioner of Police, regretting that he was unable to accept the invitation to become a member of the committee on account of his position as Commissioner of Police and the policy which he had always followed of not associating himself with any society having a bearing on his official relationship. He expressed his keen interest in the great developments which are taking place in electrical propulsion, and realised that we are on the eve of important changes in this respect.

The Incorporated Motor Users' Association asked that they might be represented on the committee, and had been invited to nominate a representative. They had appointed Mr. E. S. Shrapnell-Smith, the treasurer, for the purpose.

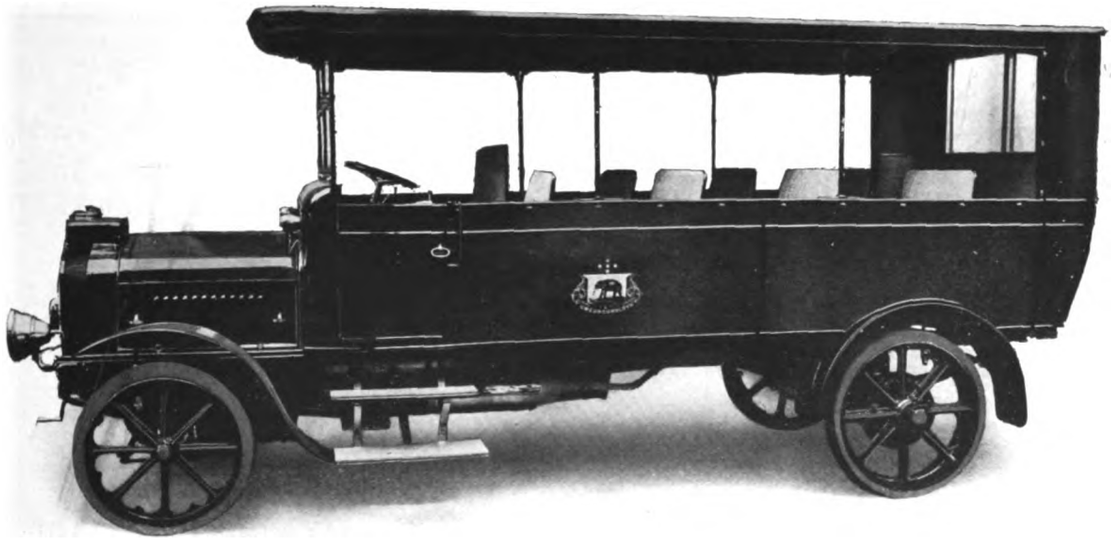
The sub-committees were appointed as follow:

Technical Sub-Committee—R. A. Chattock, F. Ayton, J. E. Edgcome, R. E. Mossay, E. S. Jacob, Conway Jenkins, J. Christie, W. H. L. Watson, B.E.A.M.A. representative of dynamo and motor section, B.E.A.M.A. representative of switch gear section.

Commercial Sub-Committee—R. A. Chattock, F. Ayton, F. E. Gripper, E. S. Shrapnell-Smith, A. H. Seabrook, A. C. Cramb, H. Faraday Proctor, W. S. Naylor, J. F. Monnot, W. R. Rawlings, J. S. Highfield (who has just been elected to represent the Incorporated Association of Electric Power Companies).

The following matters were referred to the Technical Sub-Committee: (1) Arrangements to recommend for charging batteries. (2) To decide upon the most suitable sizes of a line of charging outfits: (*a*) for direct-current systems, (*b*) for alternating-current systems. (3) Instructions for charging batteries. (4) Rules for use in maintenance of electric vehicles. (5) Standard ratings for motors. (6) Standard battery voltages. (7) Standard ratings for commercial vehicles. (8) Wiring details. (9) Standard charging plug and receptacle. (10) Standard battery units. (11) Electric lighting on vehicles.

To the Commercial Sub-Committee the following matters were referred: (1) The drafting of a circular letter to electric supply undertakings *re* provision of charging facilities, tariffs, publicity, etc. (2) Insurance rates. (3) Parades and exhibitions. (4) To collate information and publish same. (5) Taxation matters. (6) Issue of maps and lists giving information *re* charging stations. (7) Preparation and publication of publicity matter, advertising.



Stevens Petrol-Electric Char-a-Bancs for East India Tramways.

As to the standardisation of the charging plug and receptacle, the secretary reported that he was still waiting for the drawings promised by the American Association. As it would be an advantage in the future if the standard plug and receptacle could be made an international one, the secretary was directed to communicate with the German and French Institutions of electrical engineers in order to ascertain whether such a proposal would have their support.

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MOTOR TRAFFIC.

ENCOURAGEMENT OF OMNIBUS TRAFFIC.

LINKING UP BIRMINGHAM WITH DISTANT TOWNS AND VILLAGES.

In addition to promoting a Parliamentary bill for the extension of tramway routes and the development of new ones, the Birmingham Corporation are applying for powers to enable the tramways department to run motor omnibuses. At a recent meeting of the Corporation Councillor Harrison Barrow, chairman of the Tramways Committee, stated that they were negotiating with the Birmingham and Midland Motor Omnibus Company for the purchase of all their interests in the city, and he also pointed out that the company required to be afforded facilities within the city for running omnibuses to and from various Midland towns on condition that they would not in any way interfere with the tramway services. The purchase price agreed upon was £30,000, this sum also including the purchase of the depot in Tennant Street. Since October the committee have been engaged with the company in the settlement of the details prior to signing the agreement, and the company have also been preparing to carry into effect at next Whitsuntide their scheme of running omnibuses to many towns and villages within a radius of 30 miles of Birmingham. Among places proposed to be served are Walsall, Sutton Coldfield, Lichfield, Tamworth, Coventry, Warwick, Leamington, Stratford-on-Avon, Bromsgrove, Redditch, Alcester, and Evesham.

It is proposed that the company's vehicles shall run from a starting point in the centre of the city. The Tramways and Watch Committees have held conferences on the question of preserving the rights of the Tramways Committee in regard to the tramway services and also those of the committee's motor omnibus services. Considerable discussion has taken place with reference to the minimum fare to be charged by the company within the city, the suggestion having been made that the minimum fare in the city shall be in excess of the fares charged on the tramways and the Corporation's omnibuses, in order to deter the company from picking up or setting down passengers within the city in competition with the Corporation.

Partly as the result of the development already effected in the company's services to the outer suburbs and towns the Christmas traffic on the Birmingham tramways showed an increase. On Boxing Day there was an addition of £350 as compared with the same day in 1912, and on Christmas Day also the returns were augmented by holiday passengers who were brought to the city. It is now possible to travel 14 miles to Walsall on one omnibus. Passengers can also journey between Birmingham and Worcester, a distance of 26 miles (an omnibus meeting the Corporation tramcars at Rubery) for a payment of 1s. 11d., which is 3d. less than the railway fare.

At the January meeting of Birmingham Corporation the Tramways Committee presented a report stating that it is obviously desirable that the omnibus and tramway services should be under one control, and that the company were willing to sell for the sum of £34,000 their leasehold interest in the premises comprising the garage and buildings in Tennant Street, together with 13 30-H.P. and 17 40-H.P. Tilling-Stevens motor omnibuses. The agreement is conditional upon the Corporation obtaining during 1914 an Act authorising them to run a general service of motor omnibuses within the city. The company were to be permitted to run through services between the centre of the city and places outside the city. It is part of the arrangement that the company shall not compete with the Corporation within the city, and that the Corporation shall not compete with the company outside the city. The clauses dealing with these matters provide that the company shall not carry passengers in the city other than those who on the inward journey board the omnibuses beyond the city boundary, and those who on the outward journey board the omnibuses within the city, and book to some point beyond the city boundary. But if and whenever the Corporation tramway or omnibus services on any route shall have been suspended no objection shall be taken to the company carrying passengers in the city on that route during such suspension. It is, however, agreed and declared that the company shall charge every passenger carried by them within the city, irrespective of distance, a fare of not less than twice the ordinary fare charged by the Corporation for the conveyance of a passenger on a tramway or motor omnibus from the terminus near the centre of the city to the city boundary, along the route nearest to that followed by the company.

The Finance Committee also presented a report, in which they stated that the effect of this outlay upon the revenue of the tramways undertaking cannot easily be estimated, but if the omnibuses are given a life of five years, a sum of about £5,000 a year (excluding interest) will have to be provided from the omnibus revenue over and above working expenses for replacements when the omnibuses purchased pass out of service. In addition, the loan charges on the purchase price of the garage on a 30 years' purchase and on machinery and plant on a 10 years' basis will be about £800. The dead charges might therefore be taken at over £6,000 a year. On January 6 the Corporation sanctioned the scheme.

ORDERS FOR MOTOR VEHICLES.

A repeat order for four Tilling-Stevens petrol-electric omnibuses has been placed by the Johannesburg Corporation.

Sydney Straker and Squire, Limited, have received an order to supply five additional motor omnibuses to the Cambridge Omnibus Company.

Among the deliveries now being made from the works of the Daimler Company, Limited, is one of a number of omnibuses for Sheffield Corporation tramways department, lorries for the South African Railways department, Rio de Janeiro, and Antwerp.

A number of 3-ton lorries of a type passed for the War Office subsidy have recently been sold by Leyland Motors, Limited. A 4-ton wagon has been purchased by Burnley Council, at £906.

On December 18 a motor fire engine delivered to Blackpool Corporation by Leyland Motors, Limited, underwent a very satisfactory test at Blackpool. Among the visitors was the chief engineer of the London Fire Brigade.

Two tower wagons, which have recently been ordered by Glasgow Corporation, bring the number of Halley vehicles in the Council's service up to 16. Repeat orders for two 3-ton Halley lorries have been placed by the North Staffordshire Railway Company.

SCOTTISH COMMERCIAL MOTOR INDUSTRY IN 1913.

It is reported that the Halley Company experienced a very prosperous year in 1913 with their industrial vehicles. In addition to disposing of many vehicles in Great Britain, numerous orders were received from the Colonies and from South America. The Albion Company have sold many chassis for omnibus and char-a-bancs work to railway companies and to Dominion Governments. On account of the rising price of fuel there is an increasing demand for this company's paraffin carburettor, especially in tropical countries. The Argyll Company have increased their output of commercial vehicles, and the Arrol-Johnston Company are making electrical cars in which the motive power is supplied by Edison accumulators. During the year extensions of works have been made by the Albion and Arrol-Johnston Companies.

FRENCH INDUSTRIAL MOTOR EXPORTS.

During the 10 months ended October last the value of the exports of French industrial motor vehicles was £546,616. In the corresponding period of the previous year the value was only £242,348. Belgium, Germany, Brazil, Argentina, Italy, Morocco, Great Britain, Algeria, and Spain were, in the order named, the chief importers.

TILLING'S NEW COMMERCIAL VEHICLES.

For some time past Thomas Tilling, Limited, have been using, in connection with their business, special delivery vehicles of their own manufacture, suitable for dealing with loads up to two tons. These vehicles proved most satisfactory, and as a number of users of commercial vehicles had approached Messrs. Tilling to supply motor vans and lorries of their manufacture, of capacities up to two tons, for speedy deliveries, a number of these have been supplied, and are being used by the General Post Office, London County Council, Glyn, Mills, Currie's Bank, Messrs Peek, Frean, Messrs. McVitie and Price, and Fremlin Bros. The demand for these vehicles has, however, so rapidly increased, and the capacity of Messrs. Tilling's London works has been taxed to such an extent, that they are unable to cope with orders, and as a consequence have made arrangements with W. A. Stevens, Limited, whose works at Maidstone have during the past year been considerably enlarged, to manufacture the vehicles and handle the sales. For the heavier type, to deal with loads from 2½ to 5 tons, the Tilling-Stevens petrol-electric chassis, which is manufactured by W. A. Stevens, Limited, will be supplied, but in order to distinguish the two types of vehicles, those for loads up to two tons will be known as the Tilling chassis. Vehicles for heavier loads will be known, as heretofore, as the Tilling-Stevens petrol-electric chassis. Full particulars, prices, etc., for both types can be obtained from W. A. Stevens, Limited, 26, Victoria Street, Westminster, S.W.

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MOTOR TRAFFIC.

NEW MOTOR OMNIBUS SERVICES.

CANTERBURY.—A 40-H.P. Daimler single-deck omnibus has been placed in service between Canterbury and Margate by French, Bannister, and Company, of Margate. Three trips are made each way daily.

CREWE.—The Corporation have agreed to grant licences for omnibuses to Cooke's Motor Coach and Service Company, Gibson Brothers, Mr. J. Gibson, and Ward Brothers. The vehicles will run between Crewe and other towns. Ward Brothers are credited with the intention of forming a company to provide a complete service for Crewe.

DEWSBURY.—The Yorkshire (Woollen District) Electric Tramways, Limited, have been granted licences by Dewsbury and Brighouse Councils for an omnibus which is to run from Shepley Bridge and Bradley (Dewsbury) to Brighouse. Four of the company's vehicles have been licensed by the Hipperholme Council.

ECCLES.—J. Hall and Company, Limited, of Manchester, are providing an omnibus service between Eccles and Winslow.

KIDDERMINSTER.—The Kidderminster, Stourport, and Bewdley Motor Omnibus Company, Limited, has been registered with a nominal capital of £15,000 in £1 shares. The first directors are P. Allen, 296, Vauxhall Bridge Road, London, and F. H. Tozer.

LONDON.—Several of the attractive Allen vehicles which were illustrated in our issue dated July 10, 1913, are now running in London between Liverpool Street and Victoria, as well as in Kidderminster, Farningham, etc. The bodies, built by C Dodson, Limited, are mounted on Straker-Squire new "C.O." type of chassis, with live axle. It is intended to run 20 of these vehicles. The Premier Omnibus Company, with which Mr. W. P. Allen is also connected, is running several vehicles in London with De Dion chassis, and the number is shortly to be increased to 15.

MAIDSTONE.—Thomas Tilling, Limited, were on December 31 granted licences to run 10 omnibuses by the Maidstone Corporation. Councillor Wallis, chairman of the Watch Committee, remarked that the omnibuses would be put on for the service of the town and district, and would to some extent compete with the Council's tramways. Alderman Laurance expressed regret that opposition should come so quickly to the tramways, but he supposed the Council had no right to refuse the licences if the conditions were favourable. Councillor Wallis replied that the conditions under which the vehicles would run were as appended: "In any case where it is necessary for the omnibuses, in commencing or finishing their journeys, to run over portions of routes served by the tramways, the fares on the omnibuses would be at least as high as the tramway fares—a minimum of 3d. within the tramway route."

MANCHESTER.—The tramways department have agreed, after a conference with the Davyhulme, Urmston, and Stretford Councils, and the Trafford Park Company, to run a service of omnibuses between Barton Bridge, Urmston, Stretford, and Chorlton.

SANDBACH.—The Crossville Motor Company have been granted licences by the Council for two omnibuses. The company are using the vehicles to run between Winsford, Middlewich, Sandbach, Crewe, and Nantwich. Licences have also been granted by Sandbach Council to Cooke's Motor Coach and Service Company for a service from Sandbach to Crewe.

MOTOR FIRE APPLIANCES FOR LONDON.

At a meeting of London County Council on December 16 the Fire Brigade Committee reported that they had considered the question of the progress to be made during the financial year 1914-15 in substituting motor appliances for horse-drawn appliances in use in the fire brigade, and they proposed that 12 motor engines, 11 motor escape vans, a motor tender for use in connection with the instruction of members of the brigade in motor driving, and a motor boat for use by the pilots in the brigade should be obtained during the year. It was estimated that the cost of the engines would be £11,400, of the escape vans £7,150, of the tender £400, and of the boat £450. Tenders had been invited for the supply of the engines and the escape vans, and it was proposed that the chairman and vice-chairman of the committee should be authorised during the Christmas recess to open the tenders and accept the lowest satisfactory ones. It was estimated that the total cost of obtaining the appliances required, in addition to those already obtained or on order, to equip the brigade entirely with motor appliances, would be about £160,000, and the committee proposed that provision should be made for the expenditure of £80,000, including the above-mentioned £19,400, to be spread over the ensuing three financial years. The proposal was approved.

NATIONAL STEAM CAR COMPANY.

AN ARRANGEMENT MADE WITH "THE COMBINE."

The annual meeting of this company was held on December 19 in London, when Mr. G. Clare, who presided, said it would be idle to deny that the profits for the past year did not satisfy expectations. The adverse results had been largely, if not entirely, brought about by circumstances over which the board had no control, such as bad weather, temporary garage difficulties, and competition. On every route there was keen competition, and during the past year it had assumed a more acute and aggressive form. The policy of seemingly limitless expansion pursued by the London General Omnibus Company had produced a glut of traffic facilities such as London had hitherto never known. They had come to a working understanding with the combine on the basis of "live and let live." This understanding, which was a comparatively recent development, had been most honourably observed.—The report for the year to October 31 showed that the net profit was £11,465, to which £1,839 brought forward have to be added. The directors recommended a dividend of 6 per cent. on 150,000 £1 shares, which, with the bonus payable to the managing director, would absorb £9,900. To reserve £2,822 was placed, and £582 carried forward. The condition of the whole fleet being in every way excellent, the directors were of opinion that it was not necessary, in a year which had been one of exceptional stress, to write off cost at the rate the company would adopt in a normal year. Within the next few weeks the directors expect to have a fleet of 200 vehicles licensed and running. In addition to the London fleet, the company have a small number of omnibuses running in the Chelmsford district under arrangements with the Great Eastern Railway Company, who withdrew their own service of petrol omnibuses in favour of the company's type. Although not mentioned in the report, the average number of vehicles running appears from the monthly traffic return to have been 95, as against 62 in 1911-12.

MOTOR TRAFFIC NOTES.

LONDON AND PROVINCIAL MOTOR CARRIERS, LIMITED.—An interim dividend of 1s. 6d. per share has been declared on account of the year ending June 30, 1914, payable January 25.

OMNIBUS GARAGE FOR COVENTRY.—The City Council have approved of a proposal to spend £2,140 on extra land at the Priestley Bridge depot for the erection of an omnibus garage.

FOUR OMNIBUSES FOR WOLVERHAMPTON.—Upper Penn and Compton, the two principal outlying districts not yet served with adequate means of transit to the centre of the borough, are to be provided with motor omnibus services. The Corporation have decided to purchase four vehicles at an estimated cost of £2,744.

RECONSTRUCTION OF ROADS FOR MOTOR TRAFFIC.—Essex County Council have agreed to spend £26,457 on paving various main roads in the Walthamstow district, Hoe Street, and the Chingford Road, costing between them £15,012. The work has been rendered necessary by motor omnibus and other heavy mechanical traction.

TO PREVENT SKIDDING.—Satisfactory results have been obtained in a trial of the Blackburn motor fire engine fitted with a non-skid device invented by Inspector Simpson for fire engines, motor omnibuses, and lorries fitted with solid rubber twin tyres. It comprises a chain without welds, and with a knot at intervals of 4 in., which lies in the groove between the tyres.

TYRES FOR MOTOR LORRIES.—The Simplex Rubber Company, Limited, of Scrubbs Lane, Willesden Junction, have supplied "Simplex" rubber tyres to the Inter-Transport Company for their 5-ton "Berna" lorries, which are working successfully in London and the provinces, particularly in Lancashire. There are now 17 lorries belonging to this company running on "Simplex" solid rubber tyres.

SEVEN OMNIBUSES FOR SOUTHEND.—The Town Council have placed the following contracts: Three petrol chassis, £680 each, Straker and Squire, Limited; three petrol-electric chassis, £690 each, A. W. Stevens, Limited; one Edison Accumulator chassis, £825; seven car bodies, £180 each, Brush Electrical Engineering Company. It is proposed to use the vehicles in outlying districts not served by the Corporation tramways.

AMERICAN COMPETITION IN BRITAIN.—Mr. Scott-Leefe, who presided at the annual meeting of the De Dion Bouton Company on December 29, said they could have paid a dividend out of the net profit, but they thought it wise to use the money for the new works at Cricklewood.

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MOTOR TRAFFIC.

That profit had, however, been smaller than that of the previous year, and one of the causes leading to this had been the increased importation of cheap American cars.

Owner-Drivers of Motor Cabs.—The chairman of the Motor Cab Owner-Drivers' Association states there are now nearly 2,000 owner-drivers of taxi-cabs. The association is agitating for the repeal of the wheel tax, curtailment of the powers of Scotland Yard, and limiting of licence endorsements. An application is also to be made for facilities to enable the public easily to recognise taxi-cabs which are driven by the men who own them.

First Petrol Tramcar in Scotland.—The Stirling and Bridge of Allan Tramways Company inaugurated on December 10, in place of horse cars, the petrol car service on the line between Stirling and St. Ninians. The car is the first of its kind in Scotland and the second in the United Kingdom, the other being at Morecambe. If the system proves as successful as it has been at Morecambe it will be extended between Stirling and Bridge of Allan.

Railway Omnibuses Instead of Tramway Extension.—Recently the South Shields Council declined to extend the tramway system to Harton until that village was included in the borough. The residents thereupon asked the North Eastern Railway Company to augment the motor omnibus service between the two places, and on January 1 the company inaugurated a service that will not only be more frequent during the day, but will be continued to a later hour at night.

The Tylor Engine.—The War Office have approved of the use of an engine made by J. Tylor and Sons, Limited, Belle Isle, York Road, N., in vehicles passed for the War Department subsidy. This engine was tested in a Karrier vehicle during the last trials under the auspices of the War Office. A large number of these standard engines are now being made for use in commercial vehicles and fire engines, together with some 200-h.p. engines for use in rail cars on Colonial railways.

Omnibuses or a Tramway Extension?—Some of the residents in the portion of Eltham Road which is within the borough of Lewisham have asked the local Council to oppose the scheme of the London County Council for the construction of a tramway to link up the Lee Green and Eltham sections. The General Purposes Committee have replied that the question depends largely upon the decision of the Woolwich Council. Motor omnibuses are running between the two places.

Car for London County Council Chairman.—It was decided at a meeting of the London County Council on December 16 to hire a motor car from Messrs. Harrods, at a cost of £420 a year for a mileage of 6,000. The car is for the use of the chairman. The proposal was met with some pleasantry from the Socialist members, but Sir J. Benn, the Progressive leader, declared it to be the essence of democracy to enable the poorest members to accept the office of chairman.

Municipal Tramways Association and Omnibus Traffic.—London County Council have appointed the vice-chairman of the Highways Committee, the chairman and vice-chairman of the Local Government Records and Museums Committee, the chairman of the Public Control Committee, and Mr. H. H. Gordon and Mr. Henry Ward to represent the Council at the proposed Conference with the Executive Council of the Municipal Tramways Association on the subjects of motor omnibus traffic, road maintenance, etc.

Omnibus Costs in Johannesburg.—In the course of a discussion on a paper read before the South African Institute, Mr. J. H. Dobson stated that the running of petrol omnibuses in Johannesburg showed "all-in" costs of 1s. 4d. per car-mile, taking the life of the vehicle at four years. No road maintenance cost or taxes were included in the figure mentioned. He mentioned that Messrs. A. H. Johnson and Company, of Johannesburg, were placing a battery-driven tramcar at the Corporation's disposal for trial purposes.

New Central Omnibus Company.—At a meeting of this London and Bedford company on December 8, the chairman (Mr. J. O'Connor, M.P.) said that there was now accruing on the income bonds to be handed over to the company on the completion of the "deal" recently entered into with the Underground Electric Railways Company, a sum which would enable the board to declare a dividend, free of tax, of at least 12 per cent., apart altogether from any dividend that might be declared on their holding of Underground "A" shares next February. It was decided to defer until next February the calling of the winding-up meeting.

The Institution of Automobile Engineers.—A unique Christmas present has been received by the Institution of Automobile Engineers from the Society of Automobile Engineers of the United States. This consists of a large volume, bound in leather, containing press cuttings from all the American papers dealing with the visit of the members of the Institution to the States in June of last year. The volume contains an enormous amount of information as to the works visited, and it has been on view at the offices, 13, Queen Anne's Gate, S.W., up till the middle of January. It will now be sent round in rotation to all those who took part in the trip, for their perusal.

Requests for Omnibuses at Exeter.—At the suggestion of the Chamber of Commerce, the Tramways Committee are considering the desirability of providing motor omnibus services to districts not served by tramways. A deputation informed the committee that if the Council do not take the matter up, a sub-committee of the Chamber were prepared to do so. Col. Napier, of the Royal Field Artillery, has asked the committee to run an omnibus service on the Topsham Road for the convenience of men at the barracks and the Territorials whose drill hall is situated opposite the barracks. The Devon Territorial Association are willing to defray the fares of men attending the hall for drill.

Scottish Tramway Companies Combine to Meet Competition.—The newly-formed Scottish General Transport Company proposes to amalgamate the interests of the Greenock and Port Glasgow, Airdrie and Coatbridge, and Rothesay Tramway Companies, with a view to preparations for future developments. The Greenock and Port Glasgow paid 6 per cent. to the ordinary shareholders for the year ended December, 1912. The Airdrie and Coatbridge Company paid 5 per cent. last year. The Rothesay undertaking have not yet paid anything on ordinary shares. Of late years the companies have had to meet competition by motor omnibuses, and the Greenock Company have established an omnibus service of its own.

Halley Lorries for Nigerian Railway Service.—The 3-ton Halley sided lorries illustrated in the accompanying photograph form

part of an order for eight vehicles which Halley's Industrial Motors, Limited, have completed for the Nigerian Railways Transport Service, to the Order of the Crown Agents for the Colonies.

Roads Improvement Association.—Over 750 horse shoes have been entered for the Roads Improvement Association's £100 Horse Shoe Competition for which the Royal Society for Prevention of Cruelty to Animals have presented the prize money. Shoes have been received from U.S.A., Canada, China, Germany, Holland, France, Australia, and South Africa in addition to all parts of the United Kingdom. By the courtesy of the Society of Motor Manufacturers and Traders the Roads Improvement Association was granted Stand No. 85 at the Northern Motor Show (Pleasure Car Section) at the City Hall, Manchester, January 9—17. Officials of the Roads Improvement Association were in attendance to receive any suggestions or reports upon road and traffic matters.

Result of Petrol Car Traction at Morecambe.—Mr. W. H. Pickles, the chairman of the Morecambe Tramways Company, in moving the adoption of the report at the annual meeting, said there was an increase in receipts of £649. The cars had travelled 52,065 miles, an increase of 14,777, and the number of passengers had been 424,136, an increase of 105,259. The receipts per car-mile had been 13·16d., a decrease of 1·7d. per mile as compared with the previous year. The total working expenses had been 8·12d. per car-mile, as compared with 9·6d. the previous year. The report was adopted, and a dividend of 3 per cent. was declared, as against 2½ per cent. last year. The secretary (Mr. Petty), replying to a vote of thanks, said "petrol" had been the salvation of the company, which would have gone into bankruptcy but for the decision of the directors to adopt petrol-driven tramcars, the first of their kind in England.

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THE

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Including sixty-four issues, of which twelve are large Illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

ABERDARE URBAN DISTRICT COUNCIL.

TRAMCARS.

The above Council invite tenders for the supply and delivery of Four Double-Deck Tramcars.

Specification and form of tender can be obtained from the undersigned on payment of one guinea, which will be returned on receipt of a *bonâ-fide* tender.

Sealed tenders, upon the form supplied, endorsed "Tender for Double-Deck Cars," must be delivered to the undersigned not later than noon on Saturday, January 31, 1914.

The Council do not bind themselves to accept the lowest or any tender.

D. LLEWELLYN GRIFFITHS.
Town Hall, Aberdare. Clerk to the Council.

CORPORATION OF ACCRINGTON.

TRAMWAYS DEPARTMENT.

The Corporation of Accrington invite tenders for the supply and delivery of Two Double-deck Top-covered Tramcars complete and Three Single-deck Tramcars complete.

Single copies of the specification, conditions, and form of tender can be obtained on application to Mr. Harry Pilling, Tramways General Manager, Market Hall Buildings, Accrington, on payment of £1 1s., which sum will be returned on receipt of a *bonâ-fide* tender. Further copies may be obtained at a charge of 10s. per copy, which will not be refunded.

The Corporation do not bind themselves to accept the lowest or any tender.

A. H. AITKEN,
Town Hall, Accrington, Town Clerk.
January 14, 1914.

AUCKLAND HARBOUR BOARD, NEW ZEALAND.

Tenders are invited for 1-ton and 2-ton Truck Cranes, to be mounted on suitable motor wagon with solid rubber tyres.

Specifications and full particulars may be obtained from the London Agents of the Board, W. and A. McArthur, Limited, 18-19, Silk Street, Cripplegate, London, E.C.

BOURNEMOUTH CORPORATION TRAMWAYS.

The Tramways Committee of the County Borough of Bournemouth are prepared to receive tenders not later than January 29, 1914, for the supply and delivery of Four Motor Omnibuses.

Specification, conditions, and forms of tender may be obtained on application to the undersigned on payment of a deposit of £2 2s., which will not be returned except on receipt of a *bonâ-fide* tender.

Additional copies may be had on payment of £1 1s. each, which will not be returned.

The Committee do not bind themselves to accept the lowest or any tender.

I. BULFIN, B.A., A.M.I.C.E., M.I.M.E., M.I.E.E.,
General Manager.
Tramway Offices, Bournemouth.

COUNTY OF LONDON.

The London County Council invites tenders by separate contracts for the supply and delivery of (a) about 6,300 tons of Steel Girder Tramway Track Rails and Fastenings, and (b) about 1,500 tons of Slot Rails and Conductor Tees for its tramways.

Persons desiring to submit tenders may obtain the drawings, specifications, bills of quantities, forms of tender, etc., on application to the Chief Engineer of the Council, Mr. G. W. Humphreys, at the County Hall, Spring Gardens, S.W., upon payment to the Cashier of the Council of the sum of £2 in the case of each contract. This amount will be returnable only if the tenderer shall have sent in a *bonâ-fide* tender, and shall not have withdrawn the same. Particulars of the work may be obtained on personal application, and the drawings, specification, and other contract documents may be inspected at the County Hall before the payment of the fee.

The contractor will be bound to pay to all workmen employed by him in and about the execution of the contract, or any part thereof, wages at rates not less, and to observe hours of labour not greater, than the rates and hours set out in the Council's list, and such rates of wages and hours of labour will be inserted in and form part of the contract by way of schedule. Full particulars of the Council's Standing Orders on these matters are given in the *London County Council Gazette*. Tenders must be upon the official forms and the instructions therein must be strictly complied with. No tender received after 11 a.m. on Tuesday, January 27, 1914, will be considered.

The Council does not bind itself to accept the lowest or any tender, and it will not accept the tender of any person or firm who has withdrawn a tender after the same had been opened, unless the reasons for withdrawal were satisfactory to the Council.

LAURENCE GOMME,
Clerk of the London County Council.
County Hall, Spring Gardens, S.W.,
January 12, 1914.

READING CORPORATION TRAMWAYS.

UNIFORM CLOTHING.

The Tramways Committee are prepared to receive tenders for the supply of Uniform clothing, Uniform Caps, and Chesterfield Waterproofs, for their Inspectors, Motormen, Conductors, and Parcels Messengers, during the period from April 1, 1914, to March 31, 1916.

Particulars and form of tender may be obtained at the Tramways Offices, where sample garments, etc., may be seen.

Sealed tenders, endorsed "Tender for Uniforms," must be addressed to the Chairman of the Tramways Committee, and delivered at the Town Hall, Reading, not later than the 31st inst.

The Committee do not bind themselves to accept the lowest or any tender, and reserve the right to accept the whole or any portion of any tender which may be submitted.

The contractor will be required to pay not less than the standard rate of wages current in the district where the goods are made.

G. F. CRAVEN,
General Manager and Engineer.
Tramways Offices, Mill Lane, Reading,
January 15, 1914.

COUNTY BOROUGH OF WOLVERHAMPTON.

TRAMWAYS DEPARTMENT.

Tenders are invited for the supply of Uniform Clothing for the Tramways Employees.

Form of tender, together with term of contract, may be obtained on application to Mr. W. A. Luntley, General Manager, at the Tramway Offices, Cleveland Road, Wolverhampton.

Tenders, addressed to "The Chairman of the Tramways Committee," to be delivered at my office not later than noon on Wednesday, January 28, 1914.

The Corporation do not bind themselves to accept the lowest or any tender.

HORATIO BREVITT,
January 6, 1914.
Town Hall, Wolverhampton, Town Clerk.

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COUNTY BOROUGH OF WOLVERHAMPTON.

ELECTRICITY DEPARTMENT.

Tenders are invited for the supply and delivery of :—

1 Steam Turbine Driven Boiler Feed Pump.

Specification and form of tender may be obtained from the undersigned on payment of 1 guinea, which will be returned on receipt of a *bonâ-fide* tender. Extra copies may be obtained upon payment of 5s. for each copy.

Tenders, addressed to the Chairman of the Electricity Committee, Town Hall, Wolverhampton, must be sealed with wax and endorsed "Tender for Boiler Feed Pump," and delivered not later than noon on Monday, January 26, 1914.

The lowest, or any tender, will not necessarily be accepted.

S. T. ALLEN,
Chief Engineer and General Manager.

CITY OF SHEFFIELD.

ELECTRIC SUPPLY DEPARTMENT.

CONTRACT NO. 111.

Structural Steelwork for Carrying Coal Shoots, Coal Bunkers and Railway Sidings over same at the Neepsend Power House, Sheffield.

The Electrical Supply Committee of the City of Sheffield are prepared to receive tenders and detailed drawings for the above work. Contractors desiring to submit tenders and drawings may obtain specification, form of tender, general conditions of contract and plans from the undersigned on and after Monday, January 19, 1914, on payment of a sum of one guinea, which will be refunded on the receipt of a *bonâ-fide* tender if accompanied by drawings, specification, etc.

The drawings submitted by the unsuccessful tenderers will be returned if required.

The Committee reserve to themselves the right to proceed with the work in such sections as they may consider necessary.

Any person or firm sending in a tender will be required to add a schedule to such tender stating the names of the various classes of labour which he or they intend to employ, together with the place where such labour will be employed, and the rates of wages, hours of labour and conditions of employment to be paid and observed in respect of each class of labour, all of which, as shown in such schedule, shall comply with the City Council's Form of Clauses, respecting wages, hours and conditions of labour, and prohibition against assigning or sub-letting.

Tenders (enclosed in the official envelope provided), to be delivered at these offices not later than 10 o'clock, on Tuesday, February 3, 1914.

The Committee do not bind themselves to accept the lowest or any tender.

S. E. FEDDEN, M.Inst.C.E.,
General Manager and Engineer.

Commercial Street, Sheffield.

(Continued on page 71.)

POLE PAINTS

ERC

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ITALY. Chas. de Grave Sells, 5, Via Ponte Calvi, Genoa.

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SOUTH AFRICA. F. Peabody Rice, 22, Standard Bank Buildings, Johannesburg.

AUSTRALIA. H. A. E. Rothwell, Cromwell Buildings, Bourke Street. Melbourne, Victoria.

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JAPAN. W. M. Rooke & Co., 184, 5 Chome, Nakanoshima, Osaka.

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THE
Tramway AND Railway World

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SATURDAY, JANUARY 17, 1914.

THE "OCEAN"
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MOORGATE STREET, LONDON, E.C.

THE NEED FOR IMPROVED TRANSIT IN CITIES.

Among the great cities in this country the only one which so far has developed a system of underground electric railways is London. Street traffic congestion, however, is becoming more and more acute in many of the great towns of England, and the attention of local authorities is being turned to the question of providing what in America are called subways, and what we here term underground railways, for the purpose both of relieving the streets and of providing more rapid transit for people who wish to travel more than a very short distance. To a certain exent, the subject has been more or less definitely discussed in Manchester and Glasgow, and no doubt much more will be heard of it in the future in these and other towns. Somewhat opportunely, therefore, comes from America an elaborate report, presented to the Mayor of Philadelphia by Mr. A. Merritt Taylor, who was appointed a transit commissioner to investigate and report on the best means of improving the rapid transit facilities in Philadelphia. Many readers are no doubt aware that a very large proportion of the streets in Philadelphia are exceedingly narrow, and hence the local transit problem is an urgent one. Mr. Taylor, in his report, recommends the construction of certain subways or underground railways through the centre of the city, north and south, to supplement the existing rapid transit elevated and subway line which runs east and west. The new subways, it is proposed, should be constructed by the city. He also puts forward a scheme for two elevated railways to be built and worked by the Philadelphia Rapid Transit Company, leading out into the adjoining suburbs to the north and to the south-west of the city. The subways would be worked by the same company. The whole cost of construction, so far as the city is concerned, is put at over £8,000,000 sterling, and Mr. Taylor works out in elaborate tables the financial results which may be expected from the operation of the new system. He allows 6 per cent. on the lessee company's investment, and after paying all working expenses, interest and sinking fund, he calculates that after a few years the undertaking will show a large clear surplus. It appears that during the time when this report was being prepared, steps were taken by the city authorities to obtain statutory power to construct or own transit facilities, and to raise the necessary capital. A further proposal, which has not yet been passed, is to enable the city to issue 50-year bonds, instead of 30-year bonds, so as to reduce the annual sinking fund instalments from 2½ per cent. to 1 per cent. Even without this legislation, however, Mr. Taylor estimates that the undertaking will in the long run show large surpluses. It is worthy of note also by those who in this country favour municipal ownership of tramways, that the only reason put forward why the proposed subways should be constructed by the city is that they will not for some years yield sufficient returns to establish the necessary credit basis upon which a private enterprise would be able to raise the required capital at a reasonable rate. In any event, the proposal is that the Philadelphia Rapid Transit Company should work both the subways and the elevated lines. Conditions differ, of course, in this country, but at the same time if underground railways using electric traction, and running very frequent services of trains, are to be installed in various cities in this country, the question whether local authorities should own and work them is a very serious one, and ought to receive much consideration. A plan which has been adopted in New York is worthy of attention; under this the city finds the money for the construction, and the company carries out the work and runs the railway afterwards, making certain payments every year to the municipality.

NOTTINGHAMSHIRE AND DERBYSHIRE TRAMWAYS.

COMPLETION OF THE RIPLEY TO NOTTINGHAM SECTION.

Some advice as to the attitude local authorities should adopt towards tramway enterprise promoted by private companies was given at a luncheon at the Victoria Hotel, Nottingham, on Thursday, by Mr. George Balfour, of Messrs. Balfour, Beatty and Co., Limited.

At the invitation of the firm some 250 representatives of the Nottingham City Council, the Nottinghamshire and the Derbyshire County Councils, and local Urban District Councils had assembled to meet the directors of Tramways, Light and Power Company, Limited, for whom Messrs. Balfour, Beatty and Co. have just constructed a line of tramway from the thriving mining town of Ripley, Derbyshire, into Nottingham. This line passes through several growing industrial localities, and supplies a long felt want as the railway communication with Nottingham is not at all of a convenient character.

In view of the signficance of Mr. Balfour's remarks and because they relate specially to the undertaking which has just been completed, we give them priority, although they came at the end of the toast list. In replying on behalf of the firm, Mr. Balfour said it would be mock modesty on his part if he were to say that they had not had enormous difficulties to overcome in getting that line constructed. He was glad to say that the officials of the Nottingham City Council and of the other Councils affected had, while fighting for their own ends, met them in a reasonable and businesslike spirit. (Applause.) The company could not develop any tramway if they had to face the hostility of the local authorities. Now that their work was complete he could say without making it personal to that district that local authorities should be more reasonable and sensible in dealing with outside promoters. (Hear, hear.) They should at first make sure that they were dealing with honourable men, who would fulfil their obligations in the spirit and to the letter, and then encourage them to build those inter-urban lines and power stations in districts which could not possibly be served by municipal enterprise. (Hear, hear.) The difficulties that had so often to be contended against on account of the attitude of local authorities called for efforts which would accomplish four or five times the amount of work in countries where such troubles were not created. He appealed to the company present to use their personal influence with various authorities that they should first make sure with whom they were dealing, and then give such enterprises every possible encouragement. (Applause.)

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Viscount Chilston, chairman of the Tramways, Light and Power, Limited, presided over a large company, including the Mayor of Nottingham (Councillor F. Ball), Sir John Turney, Sir John McCraith, Mr. R. H. Swain (chairman of the Tramways Committee of the Nottingham Corporation), Mr. John Aldworth (general manager, Nottingham tramways), Mr. L. K. Edge (Notts C.C.), Mr. G. Balfour, Mr. Beatty, and many others.

After a sumptuous luncheon excellently served, the loyal toast was followed by that of "The City and Corporation of Nottingham." This was submitted by the chairman, who touched upon the way in which the town had succeeded in keeping abreast of the times, though many towns had lost the position of power and influence they once had. He ventured to suggest that that had been secured not only by the skill of their workmen, or by the capital and the enterprise of their merchants and employers, but also by the wisdom shown by the Corporation in administering the city's affairs. (Applause.)

The Mayor, in the course of his response, humorously observed that some of their ratepayers thought they were a little bit in front of the times, while others considered they were behind. The citizens, however, welcomed the enterprise of the Tramway Company—(applause)—who had carried out that excellent scheme of communication between the outlying districts of Notts and Derbyshire and their city. They heard a great deal about spreading the people over a larger area of the country, and he claimed such a scheme as theirs—which would be impossible for a local authority to have carried out—had that effect. (Hear, hear.) It was not only of great usefulness to the State, but to the surrounding districts. He believed also that it would be financially advantageous to the city as it would bring people in to do their shopping there. They desired to congratulate the company on the successful completion of their work, and to wish them every success. He hoped their dividends would be such as to encourage them to construct other lines into the city. (Applause.)

Sir J. Turney, whose name was also linked with the toast, declared that the citizens were delighted that the company had had the courage to carry out that work. Of course, they knew why they helped them to do it; it was because they thought the tramway would do the town some good. (Laughter.) He hoped those who had put their money into the concern would realise their ambitions.

Prosperity to the "Nottinghamshire and Derbyshire Tramways," to give the system its official title, was proposed by Mr. Swain. Speaking as chairman of the City's Tramways Committee he assured the company that they meant to do what they could to help on that line. (Applause.) They would do so for personal reasons, but also because they wished to help them. He took that opportunity of recording their gratitude to Mr. Balfour for the way he had met the committee during the various negotiations, and he paid a warm tribute to his skill as an engineer and promoter.

Mr. A. R. Holland, the only original member of the company, replied, and in the course of his observations remarked that he wished councils would be a little less exacting as to road widenings, but he was glad to hear that great improvements had been effected by the labour and money of the Tramway Company.

Sir John McCraith thanked Messrs. Balfour, Beatty, and Co. for their hospitality; a toast which was enthusiastically drunk and acknowledged by Messrs. Balfour and Beatty.

MEDICAL CERTIFICATE OR A MANAGER'S JUDGMENT.

At the January meeting of Bury Council, Alderman Greenhalgh, M.D., moved an amendment to a paragraph in the Tramways Committee's minutes instructing the manager to use his own judgment as to the advisability or otherwise of allowing a motorman to re-commence duties after an illness, even though the driver presented a medical certificate of fitness. In August one of the drivers was under his medical care, and when he was better he gave him a certificate that he was fit to resume work. The manager questioned it, and the driver was not allowed to resume for another week. The speaker was still of opinion that the man was fit to resume work, and he objected to any official, in his wisdom or otherwise, questioning a medical certificate. By that paragraph the committee were giving the manager a responsibility he ought not to have, for, supposing a tramcar with a capacity for about 65 but loaded to between 90 and 120 persons was coming down Prettywood Brow, and there was an accident, where would the responsibility lie if the manager acted contrary to the medical certificate.

Councillor Lees, to test the feeling of the Council, seconded.

Alderman Collinge, chairman of the committee, said that he was sorry that Dr. Greenhalgh should be so put about with reference to that matter. So far as the committee were concerned, they had no feeling one way or another; the committee wanted to be sure of their ground, and for that reason they sought eminent counsel's opinion on the matter. After receiving a report from counsel which bore out the Town Clerk's opinion, what could they do but accept it. They had no feeling on the question except to do the right and proper thing.

The amendment was rejected by a big majority, and the minutes were adopted, the manager being thus left to exercise his own judgment.

BOARD OF TRADE TRAMWAY RETURN.

The annual return by the Board of Trade was issued on Thursday of street and road tramways and light railways for the year ended December 31, 1912, in respect of companies, and for the year ended March 31, 1913, in respect of local authorities. A comparative table shows that since the year 1878 the route length of tramways and light railways on public roads open for traffic in the United Kingdom has increased from 269 miles to 2,662 miles; the capital expenditure from £4,207,350 to £79,359,758; the number of passengers carried from 146 millions to 3,220 millions; and the net receipts from £230,956 to £5,588,121. The number of passengers carried in the year 1912-13 is equal to about 71 times the estimated population of the United Kingdom.

Of the total of 1,818 miles of line owned by local authorities, 1,617 miles are worked by those authorities themselves or (in a few cases) by other local authorities leasing from them, and the remaining 201 miles by leasing companies. The return also includes 13 miles of trackless trolley route worked by the owning local authorities. Last year the route mileage worked by electric traction was 2,518 miles out of a total of 2,637; this year it is 2,546 miles out of 2,662, the remainder being 4.4 per cent. of the total length of line.

Of the 286 undertakings, 171 belong to local authorities and 115 to companies or other parties. The net receipts of local authorities who work tramway undertakings belonging to them or leased from other local authorities amounted to £4,095,957 on the year's traffic, and they applied £1,299,350 towards the reduction of tramway debt and £544,478 in relief of rates, while carrying £746,749 to reserve and renewal funds. In the cases of four local authorities and seven companies, the returns for tramways show an excess of working expenditure over gross receipts. Two trackless trolley systems also show a deficiency.

With regard to the appropriations for interest or dividend, etc., the return has not been restricted to showing the disposal of the net receipts earned during the year. The total amount allocated is now given, and the return shows that in 25 cases it was necessary to seek aid from rates to meet some part of the charges for the year (including interest and redemption of tramway debt). The total amount thus obtained was £64,988, as compared with £62,132 in the previous year.

The gross receipts for the whole of the undertakings amounted to £14,072,919, against £14,726,068 in the previous year. The working expenditure was £9,384,798 against £8,924,420, and the net receipts were £5,588,121 against £5,801,648. The number of cars was 12,773 electric and 487 non-electric, compared with 12,435 and 509 respectively. The number of Board of Trade units of electrical energy used was 586,106,417, against 548,696,079.

The following table gives a few totals, ratios, and percentages for the last two years, in comparison with a typical "steam" period (*i.e.*, a period in which the use of steam power on tramways was at its maximum) and a typical "horse" period:—

Tramways in the United Kingdom.	1911-12.	1912-13.	1898. Steam Period.	1879. Horse Period.
	Electric Period.			
Miles of route open: Tramways	2,637.05	2,661.69	1,064.19	321.27
Miles of route open: Trackless Trolley	5	12.59		
Total number of passengers carried	3,127,318,732	3,219,857,293	858,485,542	150,881,515
Number of miles run by cars	323,354,389	334,777,515	90,593,716	19,418,373
Capital expenditure per mile of single track open:—				
Lines and works	£13,623	£13,726	£7,770	£7,840
All items	£18,005	£18,229	£10,469	£9,877
Percentage of net receipts to total capital outlay	7.50	7.04	6.38	3.97
Do. to net capital outlay (eliminating amounts expended on construction or purchase of old lines and works now superseded)	8.15	7.64	Not available.	
Percentage of working expenditure to gross receipts	60.00	62.68	76.93	83.81
Passengers carried per mile of route open	1,183,620	1,204,011	806,703	469,641
Passengers carried per car mile	9.67	9.62	9.48	7.77
Average receipts per passenger	1.079*d.*	1.065*d.*	1.23*d.*	1.84*d.*
Amount paid in relief of rates out of profits of undertakings worked by local authorities	£488,509	£544,478	Not available.	

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OBSTACLES TO LIGHT RAILWAY DEVELOPMENT.

At a sitting on Thursday of the Royal Commission appointed to inquire into the relationship between the railway companies of Great Britain and the State in matters other than safety of working and conditions of employment, one of the witnesses was Mr. H. A. Stewart, one of the Light Railway Commissioners, who described the procedure for obtaining light railway orders. He also mentioned that the distinction between a light railway and a tramway had never been defined. In a recent rating case in the House of Lords the point was not decided, although Lord Moulton made reference to it. The witness also spoke of the cheapened procedure under the Light Railways Act as compared with a Parliamentary inquiry. The main reason why many authorised light railways had not been constructed was that the promoters could not raise the capital. A sum of one million pounds was set aside by the Treasury at the passing of the Light Railways Act in 1896 for helping the construction of light railways, but three-quarters of that sum still remained in the hands of the Treasury. The return on capital expended by light railway companies had been very small, and therefore construction of additional lines had been discouraged. If such railways were to be made to any extent it would be necessary to do it with money which had public credit behind it. If public money was to be used it would be well to have some form of public control, both as to construction and working.

MISCELLANEOUS NEWS AND NOTES.

W. T. Henley's Telegraph Works Company, Limited, notify that their telephone number is now London Wall 4560 (7 lines).

Cars Required at Kirkcaldy.—The Tramways Committee recommend the purchase of four new cars in order to meet the constantly increasing traffic.

Extensive Renewals at Bradford.—The Tramways Committee have decided to renew the track in various parts of the city, at an estimated cost of about £29,000.

Latest Suggestion for Free Rides.—Yarmouth Guardians have decided to ask the Council to permit the inmates of the workhouse to ride free on the cars on their day out.

Annual Dinner of the Tramways and Light Railways Association.—The annual dinner of this Association will be held at the Trocadero Restaurant on Friday, March 6. The Rt. Hon. Viscount Chilston, President of the Association, will preside.

Glasgow Fare Suggestions.—Among a number of suggestions now under consideration by a sub-committee are six halfpenny stages for a penny and a reduced fare for workmen. Since the ordinary fares were reduced so low, the charges have been uniform for all classes.

Materials for Car Construction.—Following the completion of 100 new cars at Glasgow Corporation works, an order was given for 150 more cars. As the necessary material cannot be obtained for two or three months a number of workmen have, it is reported, been discharged.

Mirrors for Conductors.—Looking glasses are now fixed above the top step of the Birmingham tramcars, thus enabling the conductor, when on the top deck, to see at a glance whether any inside passengers are intending to alight. Conductors say that the device saves them much time and labour.

A Sheffield Conductor's Sentence.—Mr. Pointer, M.P., has received a letter from the Home Secretary, stating that he cannot grant the petition, signed by 17,000 persons, asking for reduction of the sentence of six months' imprisonment passed on a Sheffield tramcar conductor for embezzling 1d.

Thos. Tilling, Limited, Granted Licences at Maidstone.—The Town Council have granted licences to Thos. Tilling, Limited, to run ten motor omnibuses over several of the tramway routes in connection with services to be instituted to neighbouring towns. On tramway routes the fares are to be double those charged to the car passengers.

Railless Cars and Equipment for Bradford.—The Corporation on January 13 passed a minute authorising the obtaining of 28 railless trolley cars and equipment. Councillor Priestley pointed out that the Council had decided that certain routes should be equipped, and he would like to get the work of one route through in view of the Yorkshire Agricultural Show being held in Bradford.

Trial Run of a Petrol-Electric Car at Hastings.—On January 15 a Board of Trade inspector attended a trial run at Hastings of the first of 20 petrol-electric tramcars which the Hastings and District Tramways Company propose to order from W. A. Stevens, Limited. The cars are to be operated on the sea front section in place of the Dolter surface contact system, which the Board of Trade have refused to license any longer.

Height of Railings on New Cars for Bournemouth.—The Board of Trade have informed the Tramway Committee that since January, 1905, they had required that top deck railings should be not less than 3ft. 6in. in height, and they were not prepared to waive this requirement. Subject to approval of the design of the car, which matter is being dealt with separately, the Board are prepared to sanction a loan of £12,000 for the purchase of new cars.

Huddersfield Tramways Extended to Elland.—The first tramcar ran into Elland on January 10 as a trial over the extension of the Huddersfield Corporation's system from Birchencliffe to Elland Town Hall. It was driven by Mr. R. H. Wilkinson, the general manager. Colonel Druitt, of the Board of Trade, inspected the route three days later, and expressed his satisfaction with the way in which the work had been carried out. The total length of the extension is nearly 1½ miles, made up as follows:—Double line, 1 mile 7.9 chains; single line, 2 furlongs 5 chains. The total mileage of the Huddersfield tramways is now 31 miles. To celebrate the extension Councillor Thornton, of Messrs. Thornton and Son, woollen manufacturers, gave a half-holiday to all his workpeople, with pay, and also entertained them to a ride to Huddersfield and back.

Portsmouth Tramway Brotherhood.—The Mayor (Alderman Corke), who is chairman of the Tramways Committee, the Mayoress, Councillor Timpson (vice-chairman), Mrs. Timpson, Mr. W. R. Spaven (general manager), Mrs. Spaven, Miss Spaven, Mr. Munford (traffic superintendent), Mrs. and Miss Munford, Mr. R. Waterfield (chief clerk), and other helpers combined by personal work in contributing to the success of a tea and Christmas tree to the wives and children of the tramway employees. The assembly took place on January 8 under the auspices of the local branch of the Tramwaymen's Brotherhood and Sisterhood.

The Position at Oxford.—Complaints are being made of danger to pedestrians alleged to arise from the competing services of motor omnibuses, due to the Council deciding to grant licences for twelve vehicles each to the Tramways Company and to the Omnibus Company managed by Mr. Morris. On January 9 Mr. A. Taylor manager to the former company, had five vehicles in service, and more were on order. The horse tramway and omnibus services were being continued until more of the motor conveyances had been delivered. At the Council meeting the Mayor remarked:—"The public this Christmas have enjoyed their Morris dance; for the next two years they will have to pay the piper."

End of the Leeds Strike.—On January 13, those of the gas and scavenging employees who had remained on strike accepted the offer of the Special Committee and returned to work. Alderman Wilson, the chairman of the committee, attended the Grand Theatre in the evening, and the limelights were playfully turned on to him. The large audience cheered the alderman most enthusiastically. Various schemes are on foot to recognise the services of the Aldermanic Committee, also the public-spirited volunteers who each in his vocation and calling saved not only Leeds but every municipality in the country from serious trouble.

Modification of Increased Fares.—The directors of Paisley Tramway Company have, in order to meet the objections of workmen travelling between Paisley and Renfrew, agreed to a modification of the lately increased fares. The new scale had increased the workmen's fares to 1½d., but the modification will admit of their travelling for 1d. each day for the six-stage journey. The increased scale, however, will still apply to the seven-stage journey. The re-arrangement came into operation on January 12, and while 700 more workmen were reported to have travelled by car, the train from Abercorn station had to run in duplicate, carrying 1,200 men.

London Traffic Rivalry.—On January 9 at Lambeth, a motor omnibus driver was summoned by the London County Council for unlawfully stopping to take up passengers otherwise than as close to the kerb as possible, contrary to the by-laws made by the Board of Trade in pursuance of the London County Council Tramways Act, 1896. A car driver and a passenger gave evidence that the omnibus kept on the track for some distance, and finally stopped on the track to take up a passenger. The car then ran into it. The near side of the road was quite clear. For the defence four persons stated that the omnibus was on the move at the time of the collision, when the driver was turning towards the kerb to take up a passenger. As the omnibus was on the move the summons was dismissed.

"Unsuitable" Omnibuses at Widnes.—Councillor Garghan, at a meeting of Widnes Council on January 13, drew attention to the loss on the motor omnibus service. Last year the committee estimated to run 53,000 miles, and instead of this the running totalled 56,000, and for every mile they had lost 6d. The present type was unsuitable. From inquiries made at Warrington he gathered that the cost of running there was 11d., with receipts at 10d. The rates were on the increase, and the omnibuses had been responsible for a large portion of the increase during the past few years. Councillor Hamilton said the committee had considered various schemes to make the business pay. The type of omnibus did not suit their requirements, but they had got to make the best of the vehicles.

Glasgow Deputations' Foreign Tours.—At the City Council's meeting on January 8 the Town Clerk read a question from Mr. Battersby on the subject of four recent deputations. As to the visit of Mr. Kirkland and Mr. Alston to Liverpool for the inspection of tramways, the Town Clerk said that that question ought to have been addressed to one of those gentlemen. As to Mr. Dalrymple's visit to America on tramways and bridges, the Tramways Committee, at a meeting held on the previous day, instructed the general manager to report, and that report would be submitted at an early date. The deputation representing the Tramways and Statute Labour Departments which visited England and Copenhagen on the bridges question had its report in proof at present. while Mr. Nisbet's report on his visit to America was in course of preparation.

Colne Tramways Arbitration.—The arbitration proceedings between the Colne Light Railways Company and the Colne Corporation were held on January 5 and 6, before the arbitrator, Mr. A. J. Ram, K.C., at the Surveyors' Institute, Westminster. The question for decision was the purchase price of the company's undertaking in Colne and Trawden, with a branch line to Laneshaw Bridge which the Corporation have agreed to take over. The company claim £170,000. Mr. S. Sellon, consulting engineer, said the earnings were at the rate of 11d. to 11½d. per car mile, which showed that the tramways were in the highest class. The price

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charged for current ought to be at the rate of .962d. per unit, instead of an average price of 1.625d. now paid. He estimated that a considerable sum could be saved by reducing the number of passing places on the single track and so increasing the speed of the cars. The net profit on the tramways in 1912 was £4,283, and there was a net increase in 1913 of £236. In future years there would undoubtedly be an increase of traffic. Cross-examined by Mr. Hutchinson, K.C., witness admitted that of the £170,000, £96,000 was based on present profit, and £74,000 was in respect of future profit. Mr. Hutchinson: That means that you are asking forty years' purchase?—That is so. On January 8 Mr. Harry England, general manager, Yorkshire (West Riding) Tramways Company, was called in support of the company's claim. He stated that he took 25 years' purchase as the basis of the valuation he had made, which amounted to £108,840. In cross-examination by Mr. Hutchinson, K.C., the witness did not agree that the company would make as much profit as they were claiming they would do if they continued the undertaking. He thought in nine or ten years there would be a big profit. He was unable to state the market value of the company's shares. On January 12 the case for the Corporation was opened. It is understood that their estimate of the value is about £25,000. Mr. J. E. Waller, tramways engineer, said he had taken as his basis of the calculation the figures from the last complete year—1913—when the receipts were £13,786, and the total working expenses £9,395. He produced statistics to show that the fluctuations in the receipts of the company followed the fluctuations in the condition of the cotton trade. The total estimated cost of renewal was £34,145. His total valuation of the undertaing was £23,818, but he would increase his valuation by £400 in respect of some further land which might possibly be brought into use in connection with the tramways.

CONTRACTS AND ORDERS.

Stockport Council have placed a contract with the Leeds Steel Company, Limited, for tramway rails.

Southport Council have given to the British Westinghouse Company a contract for the supply of an alternator, at £1,920.

Daimler Company, Limited, have received a contract to supply a 40 h.p. petrol motor lorry to Bradford tramways department.

Aberdeen P.A.Y.E. Cars.—As mentioned in our last issue the Brush Electrical Engineering Company have obtained a contract to supply six additional P.A.Y.E. tramcars to Aberdeen Corporation. In the course of the discussion it was stated that the accepted tender (£2,490) was £1,000 below the local firm's offer.

South Shields Council have accepted the following tenders:—2,000 kw. three-phase turbo-generator and two 600 kw. rotary converters, British Westinghouse Electric and Manufacturing Company, Limited; two water-tube boilers, with superheaters, stokers, etc., and economiser, Babcock and Wilcox, Limited.

Sheffield Council have allotted a contract to R. White and Sons for extending the coal handling aerial ropeway at Neepsend power house, £355 6s.; and to W. Marlow and Sons for foundations for three boilers, two fan houses at Neepsend, £2,403. The contract with A. Reyrolle and Co. for 14 panels of sub-station switchgear is to be extended to provide for a further 14 panels at the same price, viz., £1,682.

Edgar Allen and Co. have been awarded the appended contracts for Leyton tramways department:—One R.H. spring-point 7in. by 12ft. by 200ft. equilateral and one L.H. spring-point 7in. by 12ft. by 200ft., complete with connecting box and rods, and fitted with special hard forged steel tongues, £41 per pair, six special hard forged steel tongues, suitable for L.H. movable points, 7in. by 13ft., 6in. by 200ft., radius to left, £5 each.

Clough, Smith and Company, Limited, Spencer House, South Place, London, E.C., have secured from the Cedes Electric Traction, Limited, the contract for the erection of the overhead equipment of the Keighley Corporation trackless extensions, a length of 7 miles, at an average contract rate of £923 per route mile. This firm also carried out the first section of the Keighley trackless system, a route length of 1 mile 1,400 yards.

Manchester Tramways Committee have allotted the following contracts:—Ransomes and Rapier, Limited, wagon turn-table for Hyde Road permanent way department; Stedman, Crowther and Co., block tin; Tangyes, Limited, car wheel tire turning lathe; Till and Whitehead, Limited, metal fittings; Equipment and Engineering Company, Limited, route number plates.

Northampton Tramways Committee have recommended the acceptance of the tender of Stack, Limited, of Glasgow, at £20,352, for the Far Cotton extension and the doubling of a portion of the Kingsthorpe track. Other tenders were as follow:—Pearce, Limited (Morecambe), £20,612; A. Fidler (Northampton), £20,922; G. Law (Kidderminster), £21,319; G. P. Trentham (Birmingham), £21,486; Foster, Limited (Liverpool), £22,490; Dick, Kerr and Co., Limited (Preston), £22,571; Clough, Smith and Co., Limited (London), £23,409; Griffiths, Limited (London), £24,065; A. A. Clarke (Northampton), £24,835; R. Finnegan (Northampton), £25,407; Wimfrey and Co. (London), £26,208. For the supply of seven new cars it was decided to recommend the acceptance of the tender of the Brush Electrical Company (for body and truck) with Dick, Kerr and Co.'s electrical equipment. The price of a complete car would be £760 14s.

British Electrical Manufacturers' Association.—The annual dinner of the B.E.A.M.A. will be held at the Savoy Hotel on Wednesday next, when the President of the Association, the Rt. Hon. Lord Ampthill, will take the chair.

PERSONAL.

Mr. J. E. Ellis, borough electrical engineer to Morley Council, has had his salary advanced from £225 to £250 per annum.

Mr. W. T. Young, formerly traffic superintendent of Oldham tramways, has taken up his new duties as traffic superintendent to West Ham Tramways undertaking.

Sheffield Official's Salary.—The Tramways Committee have recommended that the salary of Mr. H. E. Yerbury, chief tramways electrical engineer, be increased to £550, rising to a maximum of £600.

Mr. F. Newey, of Rawtenstall, has been appointed electrical engineer on the staff of the Swindon electricity and tramway departments. Other applicants interviewed were Messrs. P. J. Burgess (Bath), W. T. Hilder (Aberdare), H. W. Holden (Swindon), and A. S. Robertson (Glasgow).

Mr. G. S. Duncan, consulting engineer of the Melbourne Tramways Company, who has spent some months in this country, sailed for Melbourne on the 8th inst. During his visit Mr. Duncan devoted special attention to the study of street traffic methods in London with particular reference to motor omnibuses.

Mr. C. Clarke has been advanced from the position of acting manager of Birkenhead tramways to that of general manager. Councillor Halsall said the Committee were quite satisfied with Mr. Clarke's services. Mr. Clarke, he added, had been commended in regard to different matters, and in particular with regard to the way in which he looked after the traffic during the King's visit to Liverpool. His report on motor omnibuses and the extension question also gave satisfaction to the Parliamentary Committee.

Mr. H. Holliday, engineer and manager to the Torquay Tramways Company, has been presented with a smoker's outfit in crocodile case, which bore the following inscription:—"Presented to H. Holiday, Esq., by the general staff of the Torquay tramways in appreciation of kindness, to commemorate the record year of 1913." Mr. Holliday, in replying, said he always had the interests of the company and staff first and foremost in his mind. A presentation of a clock was made by Mr. Holliday to Motorman A. Gwinnell on the occasion of his marriage. A vote of thanks was passed to the directors and the manager for increasing the wages of the staff and for the bonus paid at Christmas.

Councillor F. Spashett, chairman of Lowestoft Tramways Committee, following his annual custom, has entertained the employees at dinner. Among those supporting him were the Mayor (Councillor J. W. Brooke), the heads of the tramways and electrical departments, and various borough officials. The health of Councillor Spashett was proposed by the general manager (Mr. H. H. Saunders), who, on behalf of the employees (of whom there were 65 present), asked his acceptance of a silver tray, as a slight token of their appreciation of his interest in their welfare. Councillor Spashett said he should always value the handsome present. He thanked the employees for the way in which they carried out their duties, and hoped a more prosperous future was in store for the undertaking.

Mr. E. A. Lazarus-Barlow, who died on January 9, was chairman of the British Thomson-Houston Company during the period when the company supplied a large part of the equipment of the Central London Railway. He was also a director of the Anglo-Argentine Tramways Company.

FINANCIAL REPORTS AND MEETINGS.

Sao Paulo Tramway, Light and Power Company.—The usual quarterly dividend of 2½ per cent. is announced, payable on February 2.

Brazilian Traction, Light and Power Company.—A dividend of 1½ per cent. on the issued ordinary stock, payable February 20, has been declared.

Belfast Tramways.—For the year 1913 the Corporation tramways receipts totalled £266,004 as against £245,596. The receipts constitute a record.

Rio De Janeiro Tramway, Light and Power Company.—The board have declared a dividend of 1¼ per cent. on the issued capital stock, payable February 2.

British Columbia Electric Railway.—A dividend at rate of 5 per cent. per annum on five per cent. preferred ordinary has been declared for the half-year to December 31, with additional dividend at rate of 1 per cent. per annum for same period.

Yorkshire (West Riding) Tramways Company.—The net income for 1913 was £27,312; 4 per cent. has been paid on preference stock, £5,000 added to general reserve (making it £35,000), £2,090 to depreciation, etc., and £5,988 written off preliminary expenses (extinguishing that item); £5,521 forward.

London United Tramway Earnings.—Although the gross earnings of the London United tramways for the year ended December 31 last increased by £7,400 to £329,400, the 4 per cent. mortgage debenture stock stands no higher than 60, giving a return of 6⅔ per cent. It is expected that the next accounts will show a substantial surplus after deducting the interest charge, which is stated to have been earned nearly twice over.

Costa Rica Electric Light and Traction Company.—The net surplus profit for the year is £7,337 (against £5,732 last year), and the directors propose to carry the whole to the credit of discount and commission on debenture issues account. The power plant at El Brasil, inaugurated in December, 1911, has worked throughout the year without a hitch. The machinery for the fourth 500 kilowatt set is on order, and delivery is expected early in 1914.

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The British Electrical Federation.—The traffic statement for the week ended January 9, 1914, shows that the receipts from tramways and railways amounted to £36,744, as compared with £36,421 in the corresponding week last year, and from omnibuses £11,906, as compared with £1,343, making a total of £48,650, as compared with £37,764. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year, the receipts show an increase of £285 upon the week.

Canadian Car and Foundry.—For the year to September 30 the profits available for dividend purposes, after providing for proper depreciation, sinking and contingent reserve funds, were $1,371,653. Regular quarterly dividends were paid upon the preference shares, and two semi-annual dividends of 2 per cent. each upon the ordinary. All repairs and renewals, aggregating $350,000 in value, have been charged against earnings. The directors opened a special reserve fund for insurance and contingencies, to which $350,000 was transferred from the profits of the year, and there was added the amount standing to credit of the contingent fund, making the total $500,000.

(Continued from page 66.)

POSITIONS VACANT.

BURGH OF AYR.

TRAFFIC SUPERINTENDENT.

The Tramways Committee require the services of a Traffic Superintendent for their Tramways.

He will be required to supervise the running of the cars, arrange men's duties, and carry out the instructions of the General Manager.

Must be good disciplinarian.

Previous experience in the control of a tramway staff essential.

Wages commencing at £100 per annum, rising to £120.

Applications, endorsed "Traffic Superintendent," to be received at my office not later than Wednesday, January 28, 1914.

W. GRANT,
General Manager.

Tramway Office,
Town Buildings, High Street, Ayr.

URBAN DISTRICT OF PORTRUSH.

ELECTRICAL ENGINEER.

The Urban District of Portrush will, at their meeting on Monday, February 2, 1914, appoint an Electrical Engineer in charge of their proposed Electricity Supply Works.

Applications are invited from duly qualified electrical engineers, who will state the percentage on the total amount of the contracts they will accept for all engineering work in connection with the matter, including: Advising the Council, surveying, levelling, preparing plans, specifications, estimates and quantities, having specifications, etc., printed (if necessary), furnishing intending contractors with same, and for the engineer's duties in connection with obtaining the loan required for the work and the Local Government and Board of Trade inquiries (if any), and for all tests required, and the constant supervision of the carrying out of the contracts and the duties until the issue of the final certificates, the percentage to include all out-of-pocket expenses, printing, travelling and otherwise. The Council have obtained the Provisional Order authorising them to proceed with Electricity Supply Works.

The applications, with a statement of qualifications, addressed to "The Chairman of the Council," and endorsed "Engineer," to be lodged not later than 7 o'clock p.m. on Saturday, January 31, 1914, at the offices of the Council, Town Hall, Portrush.

The Council do not bind themselves to accept the lowest or any offer.

(By order), W. I. CUNNINGHAM,
Clerk of the Council.

Town Hall, Portrush,
January 8, 1914.

COUNTY BOROUGH OF SOUTHAMPTON.

WORKS SUPERINTENDENT.

Applications are invited for the position of Works Superintendent in the Tramways Department at a commencing salary of £150 per annum, rising by annual increments of £10 to a maximum salary of £200 per annum.

The person appointed will be required to act as engineering assistant to the Tramways Manager in connection with the rolling stock, overhead line, and permanent way. Experience in the organisation of Car Depôt work will be specially taken into consideration.

Applications, giving particulars of previous experience, present occupation and age, together with copies of not more than three recent testimonials, to be sent to the Town Clerk on or before the 21st instant, endorsed "Works Superintendent."

R. R. LINTHORNE,
Town Clerk.

Town Clerk's Office,
Municipal Offices, Southampton,
January 15, 1914.

DEPUTY TRACK FOREMAN.

Deputy Track Foreman wanted by Corporation Tramways in South of England. Wages £2 10s. a week. Good prospects for smart man. Apply, giving full particulars of experience and age, to Box No. 161, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.

WANTED.

Motor Brougham Ambulance and 30 cwt. Motor Van. Further particulars on application to the Clerk to the Lambeth Guardians, Brook Street, Kennington, S.E.

WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended January 10 amounted to £220,315, or £9,182 more than in the corresponding week last year, while the track mileage was 2,862, or 80 more than for the corresponding week. The receipts were at the rate of £76 19s. 7d. per track mile, an increase of £1 1s. 2d. per mile as compared with last year.

COPPER AND ALUMINIUM MARKET.

January 16, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton:—

	Friday, January 16.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	63 11 6 ..	63 0 0 ..	71 0 0
,, ,, (three months)	64 0 0 ..	63 7 6 ..	71 10 0
Electrolytic Copper—bars or ingots ..	66 10 0 ..	67 0 0 ..	77 10 0
Aluminium—bars or ingots	83 0 0 ..	83 0 0 ..	90 0 0

COAL MARKET.

January 16, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows:—

	Friday, January 16.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	s. d.
Best Admiralty Welsh (large)	23 9 ..	24 6 ..	24 3 ..	23 9
Best Seconds	23 3 ..	23 6 ..	23 9 ..	23 3
Ordinary Drys	21 9 ..	22 0 ..	22 0 ..	22 0
Best Washed Nuts	21 0 ..	21 0 ..	21 9 ..	21 3
Best Washed Peas	19 6 ..	19 6 ..	20 3 ..	19 0
Cardiff, f.o.b.—				
Best Admiralty (large) ..	19 3 ..	20 0 ..	19 6 ..	19 9
Best Seconds	18 9 ..	19 0 ..	18 6 ..	19 3
Ordinary Drys	17 3 ..	17 6 ..	17 9 ..	17 0
Best Washed Nuts	16 6 ..	16 6 ..	16 6 ..	16 3
Best Washed Peas	15 0 ..	15 0 ..	15 0 ..	14 0
Newcastle, f.o.b.—				
Best Steams	15 0 ..	15 0 ..	15 9 ..	14 3
Best Seconds	12 6 ..	12 6 ..	14 0 ..	13 6
Smalls	6 9 ..	6 9 ..	11 9 ..	10 6

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregate. Wks.	Aggregate. 1913-4.	Increase or Dec.
Anglo-Argentine	Jan. 7	£57,155	£58,067	1	£58,067	+ £912
Auckland (28 days)	Dec.	20,556	17,651	25	109,905	— 7,654
Ballarat and Bendigo	Nov.	4,798	3,737	34	30,725	— 711
Brazilian St. Rly. Mlrs	Nov.	44,278	53,642	17	207,214	+ 35,573
Brazilian Traction	Jan. 10	85,385	95,280	2	189,728	+ 19,224
Brisbane	Dec.	25,890	29,145	52	3 6,216	+ 61,905
British Columbia $	Nov.	741,878	746,152	22	3,760,557	+ 288,424
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacroze	Dec.	47,188	47,624	26	272,894	+ 9,337
Calcutta Rs.	Jan. 10	72,362	71,162	2	1,43,104	+ 24
Cape Town	Dec.	...	14,925	...	...	...
Carthagena & Herreria	Dec.	3,001	2,698	53	30,863	+ 4,517
Cordoba	Nov.	12,193	13,447	35	107,457	+ 10,471
East India	Dec.	1,812	2,046	22	9,879	+ 349
Kalgoorlie	Dec.	3,206	2,907	52	34,510	— 8,300
La Plata	Dec.	5,862	5,650	52	61,520	+ 9,344
Lima	Sept.	22,660	34,110	39	300,647	+ 23,783
Lisbon Mlrs.	Sept.	...	144,538	...	...	...
Madras (14 days) Rs.	Dec. 31	29,482	30,800	52	644,192	+ 46,109
Melbourne	Dec.	...	69,000	...	...	...
Mexico $	Nov.	565,239	605,467	48	6,387,905	+ 177,861
Montevideo	Dec.	34,458	33,309	9	68,689	— 267
Para	Jan. 11	3,961	3,620	6	20,461	— 3,534
Port Elizabeth	Dec.	...	4,967	...	...	...
Shanghai $	Jan. 7	20,178	23,200	1	23,200	+ 3,022
Singapore $	Jan. 10	11,159	11,814	2	23,671	+ 1,377
Toronto $	Nov.	742,156	849,279	48	8,893,984	+1,176,690
Winnipeg $	Nov.	345,031	360,082	48	3,698,831	+ 295,148

DICK, KERR & CO.,
Limited,
ABCHURCH YARD, CANNON STREET, LONDON, E.C.
ENGINEERS & CONTRACTORS.

Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1912-3.	1913-4.	Incr. or Dec.	Aggregate. Wks.	1913-4.	Increase or Dec.
Aberdeen Corporation..	Jan. 7	£1,641	£1,861	+ £217	32	£52,553	+ £3,221
Accrington Corp.	,, 7	477	553	+ 76	40	23,305	+ 2,094
Ayr Corporation	,, 10	197	245	+ 48	34	13,715	+ 1,947
Bath Electric	,, 10	855	696	— 159	1	696	— 159
Birkenhead Corp.	,, 11	1,134	1,217	+ 83	41	53,315	+ 5,007
Birmingham Corp.	,, 10	10,914	12,217	+ 1,303	41	483,544	+ 41,929
Blackburn Corporation	,, 7	1,043	1,298	+ 255	41	54,295	+ 4,840
Blackpool Corporation	,, 8	468	572	+ 106	40	77,551	+ 12,242
Bolton Corporation	,, 11	2,316	2,557	+ 241	41	112,943	+ 6,473
Bournemouth Corp.	,, 14	1,491	1,492	+ 1	41	87,126	+ 9,467
Bradford Corporation..	,, 10	4,917	5,360	— 443	40	212,865	+ 14,363
Brighton Corporation..	,, 11	792	796	+ 4	41	45,729	+ 2,981
Bristol	,, 9	7,033	7,734	+ 704	1⅓	10,061	— 179
British Elec. Federatn.	,, 9	37,764	48,650	*	...	...	...
Burnley Corporation	,, 10	1,356	1,618	+ 262	41	70,188	+ 7,796
Burton-on-Trent Corp.	,, 11	272	292	+ 20	41	12,192	+ 614
Bury Corporation	,, 11	1,145	1,166	+ 21	41	55,592	+ 2,173
Cardiff Corporation	Dec. 27	2,733	2,942	+ 209	39	107,267	+ 11,181
Chatham and District..	Jan. 8	1,114	928	— 186	1	928	— 186
Chesterfield Corp.	,, 8	219	240	+ 21	40	10,576	+ 1,207
Colne & Trawden	,, 10	193	220	+ 28	2	449	+ 26
Cork Electric	,, 8	598	515	— 83	1	515	— 83
Croydon Corporation	,, 2	1,683	1,517	— 166	39	63,994	— 6,200
Darlington Corporation	,, 10	217	236	+ 19	41	10 274	+ 960
Derby Corporation	,, 10	821	936	+ 115	41	40,487	+ 3,854
Dover Corporation	,, 10	193	189	— 9	41	10,249	+ 189
Dublin & Lucan	,, 9	166	149	— 17	1	149	— 17
Dublin United	,, 9	5,734	5,235	— 499	2	6,731	— 700
Dundee City	,, 14	1,172	1,183	+ 11	35	46,241	+ 3,290
East Ham Corporation	,, 10	1,121	971	— 50	41	42,405	- 1,864
Exeter Corporation	,, 9	298	297	— 1	41	14,186	+ 652
Gearless Mo'or 'Buses.	,, 10	...	504	...	2	725	...
Glasgow Corporation	,, 10	18,777	19,985	+ 1,208	32	654,258	+ 46,663
Glossop(U.Elec.Supply)	,, 10	106	121	+ 15	2	231	— 1
Halifax Corporation	,, 6	1,907	2,000	+ 93	40	83,753	+ 2,963
Hastings & District	,, 8	764	720	— 44	1	720	— 44
Huddersfield Corp.	,, 10	1,889	1,968	+ 79	41	87,495	+ 4,659
Hull Corporation	,, 10	3,023	3,224	+ 201	41	129,654	+ 6,719
Ilford U.D.C.	,, 10	412	428	+ 16	41	18,570	— 941
Ilkeston Corporation	,, 14	101	119	+ 18	43	5,570	+ 832
Ipswich Corporation	,, 10	365	369	+ 4	41	19,047	+ 720
Isle of Thanet	,, 10	267	276	+ 9	15	5,355	+ 500
Kilmarnock Corp.	,, 10	151	168	+ 17	34	6,116	+ 410
Lanarkshire	,, 8	2 685	2,644	— 41	1	2,644	— 41
Lancashire United	,, 7	1,299	1,671	+ 372	1	1,682	+ 174
Leeds City	,, 10	7,151	7,807	+ 656	41	332,631	+ 13,020
Leicester Corporation..	,, 10	2,488	2,762	+ 274	2	4,077	+ 398
Leith Corporation	,, 10	636	675	+ 39	34	24,561	+ 1,129
Leyton U.D.C.	Dec. 25	1,436	1,432	— 4	33½	52,118	— 883
Liverpool Corporation.	Jan. 10	12,050	12,885	+ 835	1½	19,066	+ 1,147
Llandudno & Colwyn B.	,, 9	140	144	+ 4	6	893	— 9
London County Council	,, 7	42,242	41,678	— 564	39	1,705,248	+ 4,988
London Gnl. Omnibus..	,, 10	55,354	54,503	— 851	2	108,555	— 4,864
London United	,, 9	5,614	5,494	— 160	2	6,963	— 1,010
Lowestoft Corporation	,, 10	147	168	+ 21	14	2,785	+ 232
Maidstone Corporation	,, 8	164	171	+ 7	41	8,457	+ 597
Manchester Corp.	,, 10	16,298	16,756	+ 463	41	720,920	+ 32,474
Met. Elec. Trys.	,, 9	8,724	8,383	— 342	2	10,664	— 1,630
Nelson Corporation	,, 10	157	181	+ 24	41	8,625	+ 493
N'castle-on-Tyne Corp.	,, 10	4,260	4,816	+ 556	41	201,581	+ 18,201
Newport (Mon.) Corp.	,, 10	707	740	+ 33	41	31,709	+ 2,406
New St. Helens & Dist.	,, 7	655	733	+ 69	28	23,261	+ 2,215
Northampton Corp	,, 9	500	522	+ 22	41	23,717	+ 1,495
Nottingham Corp.	,, 8	3,087	3,130	+ 43	40½	136,340	+ 5,969
Oldham Corporation	,, 11	1,938	2,095	+ 157	42	92,994	+ 6,664
Portsmouth Corp.	,, 10	1,873	2,015	+ 142	41	92,439	+ 4,521
Preston Corporation	,, 7	794	754	— 40	41	36,362	+ 2,241
Provincial	,, 10	1,636	1,693	+ 57	14	25,528	+ 1,611
Reading Corporation	,, 8	625	665	+ 40	40	28 541	+ 2,125
Rochdale Corporation	,, 10	1,327	1,415	+ 88	41	65,989	+ 2,743
Rotherham Corp.	,, 14	740	950	+ 210	41	41,864	+ 8,084
Salford Corporation ..	,, 12	4,623	4,892	+ 266	41	215,464	+ 9,883
Sheffield Corporation..	,, 11	6,735	7,293	+ 558	42	308,042	+ 23,344
Southampton Corp.	,, 7	1,190	1,187	— 3	40	53,932	+ 3,211
Southend-on-Sea Corp	,, 7	577	648	+ 71	41	33,354	+ 6,744
South Met. Trys.	,, 9	760	982	+ 222	2	1,302	+ 213
South Shields Corp.	,, 10	601	643	+ 42	41	29,696	+ 3,503
Sunderland Corp.	,, 11	1,196	1,283	+ 87	41	59,661	+ 5,648
Sunderland District	,, 7	467	624	+ 157	10	5 745	+ 600
Swindon Corporation	,, 7	147	136	— 11	40	6,776	+ 891
Trys. (M.E.T.) 'Buses	,, 10	...	8,366	...	2	11,931	...
TynesideTrys.&Tmrds	,, 7	505	459	— 46	1	459	— 46
Wallasey Corporation	,, 10	1 012	1,127	+ 115	41	50.301	+ 4,603
Walsall Corporation	,, 10	584	596	+ 12	2	887	— 44
Walthamstow U.D.C.	,, 10	638	695	+ 57	41	30,793	+ 1,170
Warrington Corp.	,, 1	469	463	— 6	40	17,733	+ 473
West Ham Corporation	,, 8	2,687	2 645	— 42	40	110 838	+ 3,941
Wigan Corporation	,, 8	1,292	1,379	+ 87	40½	60,731	+ 5,710
Wolverhampton Corp	,, 14	962	1,030	+ 68	42	45,297	+ 2,354
Yorkshire (W. Riding)	,, 11	1,030	1,356	+ 256	2	2,680	+ 132

* From such of the services as were working both last year and this year the receipts show an increase of £285 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London	Jan. 10	£5,512	£5,229	— £283	2	£10,468	— £639
City and South London	,, 10	3,020	2,879	— 141	2	5,935	— 254
Liverpool Overhead	,, 11	1,678	1,742	+ 64	2	3.455	+ 97
London Electric	,, 10	14,995	14,675	— 320	2	29,860	+ 55
Mersey	,, 10	2.224	2.267	+ 43	2	4.553	+ 1
Metropolitan	,, 11	16,657	18.212	+ 1 555	2	36.630	+ 3,160
Metropolitan District	,, 10	13,360	13.220	— 140	2	26 566	— 24

The Tramway & Railway World can be obtained, post free, at the following rates:—

For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
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Tel. No.: **2945** Gerrard.
Telegraphic Address: "**Tramigro,**" **London.**

AMBERLEY HOUSE, NORFOLK ST., W.C.

TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, January 16.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	72 — 75
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	...	4¾ — 5
5	Do. 5½% Cum. 2nd Pref.	...	4⅞ — 4 7/16
100	Do. 4% Deb. Stk. Red.	...	89 — 91
100	Do. 4½% Deb. Stk. Red.	...	96 — 98
100	Do. 5% Deb. Stk. Red.	...	97½ — 99½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	100 —103
1	Bath Electric Tramways, Lim. Pref. Ord	...	1/16 — 1/8
1	Do. 5% Cum. Pref	— 1/32	3/16 — 1/4 xd
100	Do. 4½% 1st. Mort. Deb. Stock, Red.	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	...	84 — 86
10	Blackpool and Fleetwood Tramroad Co.	...	13½ — 14
	Bombay Elec. Supply and Trams. Co., Ord.	+ 1	13 — 14
10	Do. do. 6% Cum. Pref.	...	11 — 11½
100	Do. do. 4½% Db. Stk Rd.	...	92 — 94
$100	Brazilian Traction Light and Power Co. Lim.	...	82½ — 84½
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	+ ¼	7½ — 8½
5	Do. do. 5% Cum. Pref	...	4⅞ — 5⅜
100	Do. do. 4½% 1st Deb Stock, Red.	+ 1	97 —100
10	Bristol Tramways and Carriage Co.	+ ½	5½ — 6
10	Do. do. 4% Cum. Pref.	+ ¼	6¼ — 7
100	Do. do. 4% Deb. Stock	...	100 —103
100	Do. do. 4½% Deb. Stock	...	96 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	+ 3	102 —106
100	Do. Pref. Ord. Stock	+ 1	101 —105
100	Do. 5% Cum. Perpetual Pref. Stock.	— 1	98 —102 xd
100	Do. 4½% 1st Mort. Debs.	...	98 —101
40	Do. 4½% Vancouver Power Debs.	— 2	94 — 96 xd
100	Do. 4½% Perpetual Cons. Deb. Stk.	...	91 — 94
100	British Elec. Traction Co., Lim., 6% Cum. Pref.	+ 1	88 — 91
100	Do. 7% Non-Cum. Pref.	...	52 — 55
10	Do. 6% Pref. Ord. Non-Cum.	...	12 — 14
100	Do. Deferred Ord. Stock	...	4½ — 6
100	Do. 5% Perpetual Debenture Stock	...	92 — 93
100	Do. 4½% Second Debenture Stock, Red	— 1	76 — 79
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	84 — 89
100	Buenos Ayres Lacrose Trams. Co., Stg. 5% 1st Mrt. Deb	+ ½	100 —102
5	Calcutta Tramways Co., Limited. Ord.	...	6 — 6½
5	Do do. 5% Cum. Pref.	+ 1/16	4 15/16 — 5 1/16
100	Do. do. 4½% 1st Deb. Stock, Red.	+ 1	96 — 99
1	Cape Electric Tramways, Ld.,	— 1/32	31/32 — 1 1/32
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	3 — 3¼
100	Do. 5% Debs., Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co. (1904), Lim.	...	5¼ — 5½
100	Do. 4% Debenture Stock Red, 1935	...	91 — 96
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.	...	89 — 93
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	+ ½	93½ — 95½
10	Cork Electric Tramways and Lighting Co. 6% Cum. Pref.	...	— 8
10	Dublin United Trams. Co. (1896) Lim. Ord.	...	— 11
	Do. do. 6% Pref.	...	— 12½
100	Do. do. "A" Red.	+ 1¾	— 80¼
100	Do. do. Deb. Stock "B" Red.	...	— 77
10	Gateshead & Dist Trys. Co., Ord.	...	8¾ — 9¼
10/-	Hastings & Dist. Electric Trams. Co. Ld., Ord.	...	1/32 — 1/16
1	Do. do. 6% Cum Pref.	...	1/16 — 1/8
100	Do. do 4½% Deb. Stk. Red.	...	66 — 71
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	— 2¼	92 — 96 xd
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)	+ ⅛	85 — 90
10	Imperial Tramways, Ord.	...	3¾ — 4¼
10	Do. do. 6% Cum. Pref.	...	6¼ — 6½
100	Do. do. 4½% Deb. Stock	— 1	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 6% Cum. Pref.	...	2 — 2½
100	Do. 4% Debenture Stock	...	71 — 76
1	Kalgoorlie Elec. Trams., Ltd.	...	0 — 1/16
100	Do. do. 5% "A" Deb. Stk.	...	85 — 90
100	Do. do. 6% "B" do.	...	10 — 20
7/8	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.	...	3/8 — 1
10	Lanarkshire Tramways Co.	...	9¾ — 10¼
100	Lancashire United Tramways. 5% Prior Lien Deb.	+ 2	77 — 81
1	Lisbon Electric Trams., Lim., Ord.	...	1½ — 1¾
1	Do. 6% Cum Pref.	...	1⅜ — 1⅝
100	Do. 5% Mort. Debs.	...	91 — 96
1	London and Suburban Trac. Co., Lim., Ord.	...	1/4 — 5/16
100	London General Omnibus Company, Limited. 4½% Deb.	+ ⅛	94½ — 96½
100	Do. Do 5% Cum. Inc. Deb. Stk. Red.	...	86 — 88
100	London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red	+ 1	59 — 63
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref.	...	4¾ — 5¼
5	Do. do. 5% Deb. Stk., Red.	...	93 —101
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	79 — 83
$100	Manila Electric R. R. and Lighting Corp. Capital Stk.	+ ½	108½ —111½
$1,000	Do. do. 5% Bds.	...	98½ — 99½
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref	...	7/8 — 1
100	Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red.	...	80 — 84
100	Do. 5% Deb. Stock, Red.	...	86 — 89
100	Mexico Tramways Co., Common Stock	— 1	63 — 65
500	Do. Gen. Con. 1st Mort. Gld. Bonds	— 1	73 — 78
100	Do. 6% 50-yr. Mort. Bonds	— 2½	71 — 74
...	Michigan United Railways 5% 1st Mort. Gld. Bonds	...	91 — 93
100	Montreal Street Railway, Sterling 4½% Debs. (1922)	...	99 —101
100	Do. 4½% Sterling Debs, (1932)	...	98 —100
1	National Steam Car Co. Ltd	— 1/8	3/4 — 7/8 xd
10	Oldham—Ashton and Hyde Elec. Ord.	...	5⅞ — 6¼
10	Do. do. 5% Cum. Pref.	...	5⅞ — 6¼
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	5 — 5⅛
1	Do. do. 6% Cum. Pref.	...	4½ — 4⅝
1	Perth (W.A.) Elec. Trams., Ld., Ord.	...	1½ — 1⅝
1	Potteries Electric Traction Co., Ltd., Ord.	...	1/8 — 1/4
	Do. 5% Cum Pref.	...	1/8 — 1/8
10	Do. 4½% Debenture Stock, Red.	...	84 — 87
1	Provincial Tramways, Lim., Ord.	...	3/32 — 1/8
10	Do. 5% 1st Deb. Stock	...	95 — 98
...	Puebla Tramway, Light & Power Co., Prior Lien 5%	...	76 — 80
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.	...	5 — 5¼
100	Do. do. 4½% 1st Mt. Db. Stk	...	£4¼ — 96½
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	84 — 87
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	...	97 — 99
100	Do. do. 5% 50-yr. Mort. Gold Bonds	...	89 — 91
100	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	— 1	96 — 99
$500	Do. 5% 1st Mort. Debs., Red., 1929	...	100 —102
10	Shanghai Elec. Construction Co.	...	10 — 11
100	Singapore Elec. Tramways Lim., 5% Debs. Red	...	86 — 90
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref.	...	1/2 — 3/4
100	Do. do. 4% Deb. Stk.	...	66 — 70
..	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	+ 2	96 — 98
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	97 — 99
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	83 — 84
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	92 — 95
5	United Elec. Tramways of Monte Video, Ord.	...	4¾ — 4⅞
5	Do. do. 6% Cum. Pref.	...	4¾ — 5⅛
100	Do. do. 5% 1st Deb. Stk. Red.	...	93½ — 96½
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	95 — 97
5	Yorkshire (West Riding) Elec Trys. Co., Ord.	+ 1/16	1/8 — 1/4
5	Do. do. 6% Cum Pref.	...	3½ — 4
100	Do. do. 4½% 1st Deb. Stock. Red.	+ 1	80 — 85

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

CORPORATION OF ACCRINGTON.

TRAMWAYS DEPARTMENT.

The Corporation of Accrington invite tenders for the supply and delivery of Two Double-deck Top-covered Tramcars complete and Three Single-deck Tramcars complete.

Single copies of the specification, conditions, and form of tender can be obtained on application to Mr. Harry Pilling, Tramways General Manager, Market Hall Buildings, Accrington, on payment of £1 1s., which sum will be returned on receipt of a *bonâ-fide* tender. Further copies may be obtained at a charge of 10s. per copy, which will not be refunded.

The Corporation do not bind themselves to accept the lowest or any tender.

A. H. AITKEN,
Town Clerk.

Town Hall, Accrington,
January 14, 1914.

COUNTY BOROUGH OF HUDDERSFIELD.

TRAMWAYS DEPARTMENT.

UNIFORM CLOTHING.

The County Borough of Huddersfield are open to receive tenders for the supply of Uniforms for Tramwaymen. Uniforms to be made from Alizarine Blue Botany Serge, 19/20 oz. Die for buttons will be supplied by the Corporation.

Particulars may be obtained, and sample garments inspected, on application to the Tramways Manager, Northumberland Street, Huddersfield, on or before February 4, 1914.

By order, J. HENRY FIELD,
Town Clerk.

January 22, 1914.

BOROUGH OF SOUTHEND-ON-SEA.

LIGHT RAILWAYS EXTENSIONS.

"SANDBERG" STEEL RAILS.

The Corporation of Southend-on-Sea is prepared to receive tenders for the supply of 270 tons "Sandberg" Steel Tramway Rails (British Standard Section No. 4).

General conditions of contract, specification, and form of tender may be obtained on application to the Borough Engineer, Mr. Ernest J. Elford, M.Inst.C.E., Municipal Buildings, Southend-on-Sea, on and after Wednesday, January 21, on payment of a deposit of two guineas, which will be refunded on receipt of a *bonâ-fide* tender and the return of all documents.

Sealed tenders, endorsed "Tenders for Steel Rails," and addressed to the undersigned, should be delivered before 9 a.m., Friday, February 6, 1914.

The Corporation do not bind themselves to accept the lowest or any tender.

By order, H. J. WORWOOD,
Town Clerk.

Town Clerk's Office, Southend-on-Sea,
January 17, 1914.

BOROUGH OF COLCHESTER.

MATERIALS.

The Tramways Committee of the Colchester Corporation invite tenders for the supply of the undermentioned Materials required during the year ending March 31, 1915.

1. Ironmongery and General Stores.
2. Electrical Fittings (Lighting).
3. Electrical Equipment (Cars).
4. Overhead Equipment.
5. Castings.
6. Rubber and Fibre Insulating Materials and Cable.
7. Oils, Grease, etc.
8. Car Fittings, Gear Wheels, Pinions, Springs, etc.

Samples may be seen at the Tramway Depôt, Magdalen Street, Colchester.

Forms of tender and conditions of contract may be obtained at this office.

Sealed tenders, marked respectively with the particulars to which they relate, to be sent to the undersigned not later than the morning of February 7, 1914.

The Committee do not bind themselves to accept the lowest or any tender.

R. C. BULLOUGH, A.M.I.C.E.,
General Manager and Engineer.

Car Depôt, Magdalen Street, Colchester,
January 21, 1914.

COUNTY BOROUGH OF HALIFAX.

Tenders are invited for the supply of the following Stores and Materials required in the Tramways Department of the Halifax Corporation during the twelve months ending March 31, 1915, viz.:—

Schedule No.

1. Iron and Steel.
2. Timber.
3. Bolts and Nuts.
4. Ironmongery, including Washers, Nails, Screws, etc.
5. Glass.
6. Lighting Fittings.
7. Insulating Materials.
8. Vulcanised Rubber Cable, Copper and Phosphor Bronze Wires, and Steel Binding Wire.
9. Anti-friction Metal.
10. Oils and Grease.
11. Paints and Varnishes.
12. Painting and Cleaning Brushes.
13. Cleaning Materials.
14. Castings (Malleable Iron and Cast Iron), including track brake and wheel brake blocks.
15. Trolley and Overhead Line Materials.
16. General Stores, including Rubber Window Strip, Rubber Hose, Felt Pads, etc.

Samples may be seen at the Tramways Engineer's Office, Skircoat Road Depôt, any day, Monday to Friday, January 26-30, and February 2-6, 1914, between 9 a.m. and 4 p.m.

Forms of tender and full particulars may be obtained from the Tramways Engineer, Tramways Office, Skircoat Road, Halifax.

Intending contractors must state the number of schedule required. Duplicate copies of each schedule may be obtained on payment of 6d. per copy.

Tenders, in the envelopes provided, must be sent to the undersigned on or before Monday, February 16, 1914.

Any sample submitted by the tenderers (which will not be paid for by the Corporation) must be marked "Sample, Tender for Tramway Stores," and sent to the Tramways Engineer's Office, Skircoat Road, Halifax.

The persons whose tenders are accepted will be required to observe the Fair Contracts Clause adopted by the Corporation.

The Committee do not bind themselves to accept the lowest or any tender.

By order, PERCY SAUNDERS,
Town Clerk.

Town Hall, Halifax,
January 19, 1914.

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LIVERPOOL CORPORATION TRAMWAYS.

The Tramways and Electric Power and Lighting Committee of the Liverpool Corporation are prepared to receive tenders for the supply and delivery of about 100 Standard Traction 40 h.p. Double Motor Equipments.

Official forms of tender may be obtained on application to Mr. C. W. Mallins, General Manager, Corporation Tramways, 24, Hatton Garden, Liverpool.

Tenders to be endorsed "Tender for Motor Equipments," and accompanied by full detailed specifications and drawings to be addressed to the undersigned, and received by him not later than the first postal delivery on Thursday, February 12, 1914.

The Corporation do not bind themselves to accept the lowest or any tender.

(Sgd.) EDWARD R. PICKMERE,
Town Clerk.

Municipal Buildings, Dale Street, Liverpool,
January 19, 1914.

COUNTY BOROUGH OF WEST HAM.

TRAMWAY UNIFORM CLOTHING, CAPS, WATERPROOFS, ETC.

The Council hereby invite tenders for the supply of Uniform Clothing, Caps, etc., for Tramway Inspectors, Motormen, Conductors, etc.

Standard samples may be seen, and form of specification and tender obtained at the office of Mr. J. S. D. Moffet, Tramways Manager, Greengate Street, Plaistow, E., upon payment of £1, which will be returned on receipt of a *bonâ-fide* tender.

NOTE.—No tender will be considered unless the same is delivered at the Office of the Town Clerk, Town Hall, West Ham, E., in the envelope supplied, by registered post, not later than 12 o'clock noon on February 6, 1914.

The Council do not bind themselves to accept the lowest or any tender.

The contractor will be required to enter into a bond with one surety for the due performance of the contract, and no work will be ordered under the contract until such bond has been duly executed.

The contractor whose tender is accepted, and with whom the contract is entered into, will be required to pay direct to all workpeople employed in connection with this contract the rate of wages and observe the hours of labour specified in the schedule attached to the form of tender. In the event of any breach of such agreement the Council will enforce the penalty clause in its entirety.

H. W. GREAVES,
Town Clerk.

Town Hall, West Ham, E.,
January 23, 1914.

(Continued on page 78.)

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers,
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
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As supplied to important Companies at home & abroad. Durable, ready-mixed, permanent colours that defy rust and exposure. Samples & Prices on request.
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RIPON, England

MILLARS' TIMBER AND TRADING CO., LTD.
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SUPPLY
JARRAH
THE SANITARY WOOD PAVING
REGISTERED TRADE MARK M.J.
Telegrams: "JARRAH, LONDON."
Telephone: 368, LONDON WALL.

SIMPLEX CONDUITS, Ltd.
GARRISON LANE, BIRMINGHAM.
Makers of Simplex Steel Conduit System and
WIRES and CABLES.
BITUMEN CABLES.
TRAMCAR HEATERS.
TRAMCAR METERS.
MEASURING INSTRUMENTS.
WATERTIGHT FITTINGS FOR CAR SHEDS.
ENCLOSED (Indicating) FUSES (to N.E. Code or English Standard).
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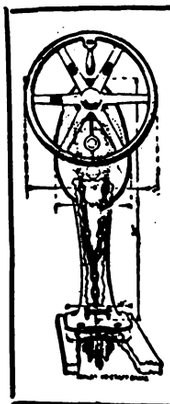
THE BRITISH ACKLEY BRAKE AND SUPPLY CO., Ltd.,
WESTINGHOUSE BUILDINGS, NORFOLK STREET, LONDON, W.C.
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Correspondents: ACKLEY BRAKE CO., 50, CHURCH STREET, NEW YORK.
Deutsche Ackley Bremsen Co., m.b.H. Charlottenburg 4-Berlin, Waitzstr. 7.
Cie. Francaise des Friens Ackley, 62, Rue St. Lazare, Paris.
BRANCH OFFICES AND AGENCIES Established at Brussels, Christiania, and Stockholm.

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THE
Tramway AND Railway World

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One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, JANUARY 24, 1914.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

THE CONTROL OF LONDON STREET TRAFFIC.

The resolutions in regard to the control of street traffic in the Metropolis arrived at by the London County Council at their meeting last Tuesday are to a certain extent a compromise, and accordingly there may be some risk of their giving complete satisfaction neither to the one extreme party nor the other. They may, however, have the better chance of being carried into effect by the Government, as they ought to command the support of a great bulk of reasonable opinion. On the one hand, the majority of members of the County Council have hitherto adhered to the recommendations of the Royal Commission on London Traffic in favour of the establishment of a Traffic Board with very wide powers. On the other hand, a minority of the Council, backed up by H.M. Government, have objected to the constitution of any such Board. The recent Select Committee of the House of Commons made proposals for the formation of a new Traffic Branch of the Board of Trade instead of a special Traffic Board, but that Committee adhered to the principle of municipal control, and proposed that all the County Councils in the metropolitan area should have power to make by-laws for regulating street traffic. The County Council have now, by a large majority, accepted the principle of constituting a new Traffic Branch of the Board of Trade, but they insist that that Branch should have executive powers and that it should be the body to make by-laws. They propose that the various local authorities should be enabled to recommend the Traffic Branch to make by-laws, but that the local authorities themselves should have no controlling power. It has, of course, been obvious all along, except to those obsessed with the idea of municipal control, that no satisfactory by-laws of universal application for the whole Metropolis could be looked for if several county councils, and possibly two or three county-borough councils, had each the power to make by-laws for their own areas. It was also tolerably absurd to suggest that county councils, such as those of London and Middlesex, which possess great tramway systems, should be authorised to make traffic by-laws for the regulation of omnibuses which compete with the tramcars. The whole of the circumstances will be better met if the present County Council proposals are carried out. The Traffic Branch will consist of a body of experts appointed for a period of years. They will act in a judicial capacity, and will consider all recommendations and objections brought before them and, if necessary, will hold inquiries. If this scheme is adopted it may, in course of time, lead on to the larger proposals of the Royal Commission, under which a Traffic Board would deal with railway traffic, with the formation of new roads, and with schemes of co-ordination, as well as with the matters which it is proposed should be allotted to the new Traffic Branch of the Board of Trade. Even as things stand, however, this Branch will have a good deal to do if constituted, as it has to combine all the traffic duties at present carried out by the Home Office, the Local Government Board, and the Board of Trade. A number of the other resolutions passed by the County Council are similar to recommendations made by the Select Committee. Some regret may be felt that the Council did not also pass a resolution in favour of the abolition of the veto of the borough councils on new tramway proposals. The Select Committee recommended the abolition of this veto, but it was pointed out at the meeting of the County Council that if the Traffic Branch is constituted the effect of the veto will probably be considerably diminished. The question now is, what reception will be given by the Government to the proposals of the County Council? It is to be hoped that when the deputation from the Council wait on the Prime Minister and the President of the Board of Trade to urge that the Government should give effect to the Council's resolutions they will not be met by the same *non possumus* which has greeted their efforts in the past to get a Traffic Board established for London.

MOTOR SHOW AT MANCHESTER.

Exhibits exceeding £50,000 in value will be staged at the North of England Exhibition of Commercial and Industrial Motor Vehicles, which will be held in the Manchester City Hall from Saturday, January 31 to February 7. This exhibition now rivals the Olympic Show in importance, and being held in Manchester it is conveniently reached by visitors from the greater part of the country. British vehicles, tyres, and other accessories will be shown side by side with the products of some of the leading Continental manufacturers, and the industry has now reached the stage when the exhibitors are prepared to give full particulars as to the cost of running and maintenance. Double and single-deck omnibuses, together with chars-a-bancs, will be prominent among the exhibits. All the well-known makers will be represented, including the Albion Company, Limited, Argylls, Limited, British Berna Motor Lorries, Limited, Daimler Company, Limited, Dennis Bros., Halleys, Limited, Leyland Motors, Limited, W. A. Stevens, Limited, Sydney Straker and Squire, Limited, and Thornycroft, Limited. Tyre and accessory makers will include the Avon India Rubber Company, J. W. and T. Connolly, Continental Tyre and Rubber Company, Coventry Chain Company, Dunlop Rubber Company, Peter Union Tyre Company, Shrewsbury and Challiner Tyre Company, etc.

Tramway Brotherhood.—Delegates from all over England attended the annual conference of the Tramwaymen's Brotherhood, held on January 17 at Kennington, London. Portsmouth tramways were referred to as having the largest membership, and Birmingham also received praise. On Sunday evening last the annual parade of tramwaymen, motor cab and omnibus drivers, and firemen took place at St. Mark's Church, Kennington, when the Bishop of Stepney preached. After the service the men walked in file through the vestry and shook hands with the Bishop, the chairman of the London County Council, and the Mayors of Lambeth, Camberwell, and West Ham.

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LONDON MOTOR TRAFFIC PROBLEM.

At a meeting of the London County Council on Tuesday last the General Purposes Committee presented a report dealing in detail with the report of the Select Committee of the House of Commons on motor traffic in London, which was issued in August last. The General Purposes Committee made an extended analysis of all the proposals and opinions contained in the Select Committee's report, a summary of which has already been published in our pages. Quotations were given from opinions expressed by various committees of the Council on proposals of the report so far as the work of these committees would be affected. The General Purposes Committee reviewing all these opinions came to the conclusion to make recommendations to the Council to the following effect :—

That the Council concur with the view of the Select Committee that in all metropolitan traffic matters Parliament should be advised by one department, which should combine the traffic duties of the Home Office, Local Government Board, and Board of Trade.

That the Council signifies its willingness to accept a new Traffic Branch of the Board of Trade as a suitable authority for dealing with traffic matters in Greater London, provided that it consists of a small number of specially qualified persons, selected solely on the ground of their competence and holding office for a considerable period.

That County Councils within the area for which this Traffic Branch be established should be empowered to submit proposals for dealing with traffic matters, that the Traffic Branch should consider all criticisms submitted thereon, if necessary hold a public inquiry, give their decision, and if necessary make by-laws.

That Borough Councils within the area should be empowered to submit proposals on matters that fall within their jurisdiction to the Traffic Branch.

That closer control of traffic should be exercised by the police.

That it is desirable that the police should continue to license vehicles, subject to the powers of the Traffic Branch to make by-laws as to numbers, etc.

That traffic points should be fixed at a greater number of crossings.

That more refuges should be provided.

That means should be taken to remove the congestion caused by tramway dead-ends, street markets, and other obstructions.

That the measures already taken through the schools to warn children and parents as to street dangers should be continued and extended.

That the Council concur in the view of the Select Committee to the effect that instead of the limits of the Metropolitan Street Act, 1867, being fixed at six miles from Charing Cross they should be extended to embrace the whole of the metropolitan area.

That the Council concur in the view expressed by the Select Committee to the effect that a method should be devised by which opinions held by the police as to routes to be taken by proposed tramways may be before the minds of County Councils at an early point, and not be put in an antagonistic position before Parliament.

It was further proposed that these resolutions be communicated to the Prime Minister and the President of the Board of Trade, and that these gentlemen should be requested to receive a deputation from the Council to urge that the Government will at the earliest possible date take all necessary steps to give effect to the resolutions.

A long discussion took place, and after several divisions at the instance of the Progressive party, the resolutions were carried.

L.C.C. TRAMWAY MATTERS.

The London County Council met on Tuesday for the first time after the winter recess, and some interesting tramway matters were considered. The most important item was the proposals regarding the control of London street traffic, which are outlined elsewhere.

TESTING CAR MOTORS.

The Highways Committee reported that the following tenders had been received for the provision of control gear and recording apparatus for use in testing car motors at the central car repair depôt :—

Edison and Swan United Electric Light Co. ..	£70 10s., less 2½ per cent. discount.
India Rubber, Gutta Percha and Telegraph Works Co.	£73 15s., less 2½ per cent. discount.
Nalder Brothers and Thompson	£77 15s.
British Westinghouse Co.	£91 10s., less 2½ per cent. discount.
Johnson and Phillips, Charlton, S.E.	£106.

The estimate of the chief officer was £70. The Committee had accepted during the Christmas recess the tender of the Edison and Swan Company.

STEAM PIPING.

The undermentioned tenders were received during the recess for the provision of steam, exhaust condenser, feed, etc., piping, water tanks, etc., at the Greenwich generating station :—

Brightside Foundry and Engineering Co.	£5,438 15 0
Staveley Coal and Iron Co.	5,973 9 4
Edward Le Bas and Co.	6,290 0 0
Butterley Co., Derby	6,634 10 5

The estimate of the chief officer was £7,000. The Committee recommended, and it was agreed, that the tender of the Brightside Foundry and Engineering Company should be accepted, and that the company should be allowed to sublet as follows :—(1) Stewarts and Lloyds, steam pipes and other high pressure pipes; (2) James Oakes and Co., circulating pipes; (3) Newton Chambers and Company, hot wells.

JUNCTION CURVES.

In connection with the reconstruction for electric traction of horse tramways from Highbury Station to City Road, which was at present being proceeded with, the Committee had had under consideration the question of installing junction curves leading from Essex Road northwards into Canonbury Road. A double line junction at this place would prove of great utility. The cost was estimated at £4,000, and it was recommended that the work should be carried out, the special trackwork required to be obtained from Hadfield's Steel Foundry Company at a cost not exceeding £2,220. This was approved.

PROPOSED LAY-BY IN THE EAST END.

The Committee had considered the question of dealing with the tramway traffic in the East India Dock Road, where it was very heavy. At the busy hours several cars were reversed at West India Dock Road. Owing to the heavy tramway and general vehicular traffic this arrangement was not satisfactory, and the Committee were advised that it was desirable that a lay-by should be installed in West India Dock Road at its junction with East India Dock Road. The cost was estimated at £1,200, and it was proposed that the work should be carried out by the staff of the tramway department. The Committee recommended accordingly, and that the special trackwork required be obtained from Hadfield's Steel Foundry Company at a cost not exceeding £300. The proposal was adopted.

SUPERINTENDENT OF CENTRAL CAR REPAIR DEPOT.

The Council in April last year decided that a superintendent of the central car repair depôt should be appointed on the permanent staff at a salary of £300 a year. The Committee were subsequently of opinion that it was not desirable that a permanent appointment should be made at that time, but that a superintendent should be appointed temporarily. The Council accordingly in June had rescinded the resolution of April. Mr. G. W. Knight, one of the candidates, was temporarily engaged as superintendent, as from June 23 last. During the time that he had been employed Mr. Knight had carried out his duties in a very satisfactory manner, and the Committee now proposed that he should be placed on the permanent staff at a salary of £300 a year. This was confirmed.

THE TICKET CANCELLING MACHINE.

On the proposal of the Committee it was agreed that the seal of the Council be affixed to a new agreement with Mr. George Gibson, a foreman in the ticket punch branch of the tramway department, providing that the Council may, should it so desire, use without any payment for royalty the ticket cancelling machine invented and recently improved by him.

MISCELLANEOUS NEWS AND NOTES.

To Relieve Congestion.—Early in February the Liverpool Tramways Committee will inaugurate a new belt route from the Old Haymarket and back, with the object of relieving the congestion on the Wavertree and Southdown Road routes

Omnibus Scheme for South Shields.—On the advice of Mr. W. T. Robson, the tramways manager, the Tramways Committee on January 20 decided to recommend the Council to inaugurate a motor omnibus service from Stanhope Road to serve the Boldon colliery districts.

The British Electrical and Allied Manufacturers' Association.—At the Council meeting of the B.E.A.M.A., held at the offices at King's House, Kingsway, London, W.C., on January 15, Messrs. Bray, Markham and Reiss, W. T. Glover and Company, and Siemens Brothers and Company were elected members of the Association.

Experiment in Through Reserved Cars.—Birmingham Tramways Committee have resolved to experiment with the running of through reserved cars from the centre of the city to the suburban district of Alcester Lanes End, in order to prevent the long-distance passengers from being crowded out by people who travel only a penny stage. The service is an 18-minute one.

A Huddersfield Extension.—Alderman Aston, chairman of the Tramways Committee, officiated at the opening of the extension of the Huddersfield tramways to Elland on January 14, and Mr. S. Lumb, chairman of Lumb Council, drove the car on approaching the terminus. At a luncheon Alderman Aston expressed a hope that they would soon be able to link up with Halifax and have inter-running.

Birmingham and All-Night Cars.—A memorial signed by 5,689 persons in favour of a service of cars during the night was presented to the Tramways Committee on January 20. Councillor Barrow, the chairman, said that if the committee could do anything to meet the desire of the night workers they would be pleased, but in no circumstances could they see their way to the adoption of a universal service of cars throughout the night.

Collapse of the Dublin Strike.—During the week nearly all the dock and steamship hands resumed work after a strike lasting many weeks. The Dublin United Tramway Works reopened on January 19. The works closed down in August last through the action of the coachbuilders in refusing to repair cars damaged by strikers. Sixty-eight of the 113 men were re-employed at Inchicore, and, with two or three exceptions, the remainder have been taken on at the Ballsbridge works and other depôts, all on the condition that they handle all goods and obey all orders.

The Rule Governing Extensions at Leeds.—In recommending a railless trolley traction clause in the Corporation Bill to the meeting of ratepayers, Alderman Smithson, chairman of the Tramways Committee, said they had always refused to take up any scheme

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unless satisfied that it was likely to prove profitable. The extension was a very small one and the Guiseley route was one of the best paying ones in the system. The extension would serve a population of about 16,000 people. Councillor Gath (Labour), in supporting the resolution, said that he did not want to see Wakefield cars getting on ground which Leeds should occupy. The population were gradually getting towards the outskirts.

Leith Council and Trail Cars.—A councillor suggested at the January meeting of the Town Council that the question should be considered whether or not it would be beneficial to have trail cars at busy times, as, for instance, in the summer, when the pleasure steamer season was in full swing. Councillor Finlayson said if they wanted more accommodation the proper thing was to get more cars. No action was taken.

"Status" Prize.—The Council of the Society of Engineers (Incorporated) may award in 1914 a premium of books or instruments to the value of £10 10s., for an approved essay on "The Status of the Engineering Profession." The Council reserve the right to withhold the premium if the essays received are not of a sufficient standard of merit. The competition is open to all, but, before entering, application for detailed particulars should be made to the Secretary, 17, Victoria Street, Westminster. The last date for receiving essays is May 30, 1914.

The Petrol-Electric Cars for Hastings Sea Front.—Approval has been given by the Board of Trade to the conversion of a car running on the sea front tramways to the Tilling-Stevens petrol-electric system of traction. A number of other cars are also undergoing conversion by W. A. Stevens, Limited. On January 15 Greater Omnibus Services, Limited, wrote to the Town Council offering to run omnibuses on the esplanade route and the Council decided to pass to the next business, the Mayor remarking that the Licensing Committee would know how to deal with the application for licences.

Doncaster Tramways Annual Dinner.—The seventh annual dinner of the tramways and electricity staff and employees was held at the Guildhall on January 13, Mr. E. S. Rayner, general manager, presiding. The guests included the Mayor, the Mayoress, a number of the councillors, and the borough surveyor. In proposing the toast of the Corporation, the chairman remarked that as tramway employees they were fortunate in serving under such a Corporation. During the past year the Corporation had granted increased rates of pay, which showed they felt they were very well served. It was proposed to extend the tramways to Brodsworth and Edlington, and it was also proposed to purchase omnibuses to run from outside termini to connect with the various other colliery villages. After dinner an enjoyable programme was gone through, the principal items being a song by Mrs. Rayner, monologue by Mr. Rayner, and duets and solos by members of the staff. The songs rendered by Mr. F. P. Suthery, of the General Electric Company, were much appreciated. A play was performed by members of the staff, and dancing took place until an early hour.

Close of the Colne Tramways Arbitration.—The arbitration proceedings which have been conducted by Mr. A. J. Ram, K.C., concerning the price to be paid by the Colne Borough Council for the undertaking owned by the Colne and Trawden Tramways Company, were concluded on January 19. Mr. Hutchinson, K.C., in summing up the case for the Council, said the price must not be fixed on the basis of the prospective value for all time, because then they could find no possible willing purchaser.—The Arbitrator: I must disregard a claim by which the vendor takes the profits for all time?—Mr. Hutchinson said it was a contractor's line and the capital had never been raised by the company, which still owed £50,000. Mr. Lloyd, K.C., on behalf of the company, said he was at a loss to understand how two engineers, eminent in their profession, could arrive at such widely differing figures as those given. Had anybody on the other side taken the trouble at an early stage to go into those differences, at least four or five days of that inquiry might have been saved.—The Arbitrator intimated that he hoped to give his award before the end of the present month.

BRITISH ELECTRICAL MANUFACTURERS.

The members of the British Electrical and Allied Manufacturers' Association and their friends met at the Savoy Hotel on Wednesday evening, the occasion being the annual dinner of the Association. Lord Ampthill presided, and there was a company numbering about 450 including :—

Lord George Hamilton, Mr. F. E. Smith, K.C., M.P., Sir William Wiseman, Sir John McCall, Sir J. W. Taverner, Sir D. Yule, Mr. G. A. Touche, M.P., Mr. J. M. Henderson, M.P., Mr. J. Annan Bryce, M.P., Mr. F. R. Davenport, Mr. F. H. Nalder, Mr. A. D. Williamson, Mr. A. P. Wood, Mr. B. Longbottom, Mr. W. O. Smith, Mr. F. C. Gibbons, Mr. E. S. New, Mr. P. A. Lange, Dr. W. C. Unwin, Messrs. Wm. Johnson Galloway, A. H. Stanley, C. P. Sparks, H. F. Parshall, W. Rutherford, Jas. Devonshire, J. Aldworth, H. C. Levis, Samuel Insull, L. B. Atkinson, Owen H. Smith, H. Hirst, Colonel H. C. L. Holden, W. Duddell, A. Bruce Anderson, W. E. Garforth, Glazebrook, Faithfull Begg, W. T. Stubbs, C. Koettgen, Herbert W. Ely, A. W. Tait, J. McNaught, W. M. Mordey, G. F. Preston, O. H. Baldwin, R. W. Blackwell, E. Hatton, C. H. Dade, Fearnside Irving, D. N. Dunlop (secretary).

All branches of the electrical industry were well represented, and the proceedings were of an unusually interesting and enthusiastic character. The speakers included Lord Ampthill, president of the Association, Mr. A. Bruce Anderson, president of the Association Council, Mr. F. E. Smith, M.P., Mr. W. Duddell, president of the Institution of Electrical Engineers, the Rt. Hon. Lord George Hamilton, and Mr. F. R. Davenport. The principal topic of the evening was the condition of the British manufacturer in the face of increasing competition from abroad and the handicap of foreign tariffs, which curtail his market while no similar restraint is placed upon the activity of foreigners in the United Kingdom.

CONTRACTS AND ORDERS.

Babcock and Wilcox, Limited, are supplying a water-tube boiler to Leigh Council.

Mr. W. J. Turnbull has obtained a contract for the erection within six months of a tramcar depôt at Guiseley for Leeds Corporation, at £14,050.

Rotherham Council have placed a contract for extensions to the tramcar shed, at £6,755, with Chadwick and Co.

Crompton and Co., Limited, have received a contract to supply a high-tension switchboard to Great Yarmouth Council, at £883.

Dundee Council have placed contracts with Dick, Kerr and Co., Limited, and Willams and Robinson, Limited, for the supply of 5,000 kw. turbo-alternators with condensing plant.

Northampton Council have adopted the recommendations of the Tramways Committee, given in our issue dated January 17, regarding tenders for tramway extension and the supply of seven cars.

Ashton-under-Lyne Council have allotted a contract to the United Electric Car Company, Limited, for the supply of two car bodies and trucks, and to Siemens Bros. Dynamo Works for the equipments.

The Electro-Mechanical Brake Company, Limited, West Bromwich, have received an order from the Bradford Corporation for thirty sets of their "EMB" jointless grid resistances for railless trolley omnibuses.

Glasgow Council have placed contracts as appended :—Steel conduits and fittings, Siemens Bros. Dynamo Works, Limited; washed dusters, James B. Horne; electrically controlled clocks for Coplawhill Car Works, Edward and Sons; special track work, Loraine Steel Company.

North-Eastern Steel Company, Limited, were the successful tenderers for the supply of tramway rails to Southampton Council, at the following prices :—100 tons of B.S.S. No. 4, £6 12s. 6d. per ton; 20 tons of B.S.S. No. 4 C, £6 12s. 6d. per ton; additional price per ton for Sandberg quality, 5s. Walter Scott, Limited, Bolckow, Vaughan and Co., Limited, and Lorraine Steel Company, Limited, also submitted tenders.

Petrol and Tire Contracts.—Alderman Spencer, chairman of Halifax Tramways Committee, at the January meeting of the Council, alluded to the receipt of tenders for petrol and omnibus tires, and suggested that the decision be delayed, as the committee hoped to arrive at better terms than previously arranged. The omnibuses were not running at a profit, but the committee hoped to reduce the loss by securing better terms for petrol and tires.

Manchester Council have accepted the following tenders :—Chloride Electrical Storage Company, Limited, supply and maintenance of a traction storage battery at Dickinson Street station; Lancashire Dynamo and Motor Company, Limited, reversible booster, regulator, and switchgear for the traction storage battery (switchgear sublet to Mr. Bertram Thomas); British Westinghouse Company, Limited, two 300 kw. rotary converters; Electrical Engineering and Equipment Company, Limited, cable; Siemens Bros. Dynamo Works, Limited, two 500 k.v.a. static transformers.

London County Council have accepted the following tenders :—Edison and Swan United Electric Light Company, control gear and recording apparatus for use in testing car motors at the central car repair depôt, £70 10s., less 2½ per cent. discount; Brightside Foundry and Engineering Company, steam, exhaust, condenser, and feed piping, water tanks, etc., for Greenwich generating station, £5,438 15s.; Hadfield's Steel Foundry Company, special trackwork for junction curves between Essex Road and Canonbury Road, £2,220, and special trackwork for tramway lay-by in West India Dock Road, £300; Messens, Limited, Gracechurch Street, E.C., 120,000 wedges and 447,000 packing pieces, £663 2s.; W. F. Dennis and Co., Queen Victoria Street, E.C., 11,777 yards of 4/0 grooved trolley wire, £608 19s. 3d.; R. Hyde and Son, Sheffield, 12,100 driving and common links, £316 17s. 6d.; Babcock and Wilcox, 50 boiler tubes, £68 2s. 6d.; J. Billingham, Cradley Heath, 5 tons of treadplate, £82 17s. 6d.; G. A. Harvey and Co., Woolwich Road, S.E., repairs to 2,000 damaged fare bill plates, £95 16s. 8d.

Bradford Council have placed a contract with the Adnil Electric Company, Limited, to supply, deliver, and erect at the Valley Road Electricity Works, a 5,000 kw. turbo-generator, running at 1,500 revs. per minute, manufactured by the Bergmann Electrical Works, Berlin, at £9,370. The *Leeds Mercury* says that the Electricity Committee paid a hurried visit to Berlin, and that "all the leading British firms were in competition for the order, some of them at exceptionally low prices, but the decision is understood to be influenced partly by a more speculative guarantee on the part of the German firm, and partly by some prejudice existing against British manufacturers, who have associated themselves together in order to obtain fair conditions of contract in municipal work. Certain Yorkshire firms were in the running, and it is understood the differences in the prices were not such as to justify the placing of the contract abroad. As already stated, the question of the guarantee is understood to have been the determining factor. The British makers insist upon a 10 per cent. margin in the matter of fuel consumption and power, whereas many foreign firms take the risk of the rejection of their plant in the event of the specified guarantee not being strictly carried out. Any variation from the British guarantee is, of course, subject to a penalty, but the firms insist upon a 10 per cent. margin being allowed them before rejection. As Bradford is a nursery of labour politics, it is believed that some local protest may be raised against important work going abroad before the question is finally settled by the Council."

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PERSONAL.

Mr. R. L. Acland, borough electrical engineer and tramways manager, has been given an increase of salary to £500 per annum by Chesterfield Council.

Mr. J. C. Richards, of the Erith Council tramway, out of 51 applicants, has been appointed chief inspector to the Ilford Council tramway undertaking.

Mr. F. L. Pedley, of the Bradford Council electricity works, has received the appointment of electrical engineer to Bingley Council. One hundred and seventeen applications were submitted.

Mr. T. G. Marsh, of the Chatham and District Light Railway Company, on being appointed chief inspector to the Maidstone and District Motor Services, has been presented with an umbrella and pocket wallet by the Chatham staff.

Messrs. J. O. Griffiths and **W. G. Coates,** respectively of Southport and Manchester, have received appointments under the Radcliffe tramways and electricity department, the former as mains assistant and the latter as shift engineer.

Mr. G. W. Knight, temporarily engaged as superintendent of London County Council central car repair depôt, as reported in the L.C.C. proceedings, has been placed on the permanent staff in the same post at a salary of £300 a year.

Mr. H. McKay on resigning the appointment of draughtsman to Aberdeen Corporation tramways, in order to join the staff of Preston Corporation tramways, has been presented with a set of water colours. Mr. Forbes, traffic superintendent, handed the gift to the recipient.

Musselburgh Appointments.—Following upon the resignation of Mr. C. W. Bentley, Mr. Robert Watson, the commercial manager, and late secretary of the company in London, has been appointed manager of the Musselburgh and District Electric Light and Traction Company. Mr. D. I. Winter, Bo'ness, has been appointed resident engineer.

Mr. E. W. Sleight, engineer and manager of the Carlisle Electric Tramways Company, presiding at the ninth annual dinner of the employees, mentioned that this was the first occasion on which they had met together in a social capacity as the guests of the citizens of Carlisle since Messrs. Balfour and Beattie took over the system. He referred to the good feeling existing between the company, their employees, and the public, and emphasised how much the men could foster that feeling by civility and courtesy.

New Appointments for Glasgow Officials.—Mr. George Pollock, who has for some time been employed in Dennistoun depôt of the Glasgow tramways, left recently for Shanghai, where he will receive an inspectorship under Mr. Donald MacColl, a former official in Glasgow. Mr. S. Jameson, of the mains staff, has received an appointment as assistant mains superintendent on the London County Council tramways. Mr. George Barclay, who is on the head office staff, has been appointed traffic superintendent of the Delhi tramways.

Messrs. W. T. Dawson and J. O. Shepherd, respectively general manager and secretary to the Wemyss and District Tramways Company, were the subjects of congratulatory remarks at the annual dinner and dance of the employees. Mr. Russell, in proposing the toast of the Tramways Company, stated that in 1906-7, the first year of running, 1¼ million passengers were carried, while in 1913 they reached the record total of over two millions. In acknowledging the toast, Mr. Shepherd observed that they had an excellent manager, who was respected by every employee. Mr. Dawson announced the receipt of gifts from the directors for the employees, their wives, and children.

Promotions in L.C.C. Chief Engineer's Department.—At last Tuesday's meeting of the London County Council, the Establishment Committee adopted a report recommending that Mr. W. C. Copperthwaite, assistant engineer in charge of the bridges branch, be promoted to the position of chief assistant engineer, and that his salary of £900 be increased to £1,000 a year. It was also agreed that a personal allowance of £50 a year be granted to Mr. H. M. Rounthwaite, the mechanical engineer. The maximum salary attaching to the position is £800 a year, and having regard to the high terms in which the chief engineer spoke of Mr. Rounthwaite's capacity, the Committee proposed the grant of a personal allowance of the amount mentioned. The following other recommendations were also approved:—That Mr. P. R. Jones (£300), assistant in the first-class, be promoted to be a senior assistant at a salary of £350 a year; that Mr. W. H. Pickin be placed in the first-class in the chief engineer's department at his present salary of £300; that Mr. J. B. Cook be appointed in section B in the first-class in the chief engineer's department at the commencing salary of £215 a year.

FINANCIAL REPORTS AND MEETINGS.

Electric Construction Company.—An interim dividend at rate of 7 per cent. is announced on preference shares for the half-year to November 30.

Llandudno and Colwyn Bay Electric Railway.—Accounts for year to November 30 show available balance of £9,021, including £1,258 brought forward, and after providing for debenture service, directors recommend dividend of 4 per cent., compared with 3½ per cent. previous year, £919 forward.

£4,000,000 Loan for Moscow.—Tramway extensions are included among the objects for which Moscow City Council will shortly seek to raise a loan of £4,000,000. Municipal waterworks, gasworks, tramways, and pawnshops, showed in 1908 a net profit of 1.88 per cent. on the capital invested in these enterprises. In 1912 these profits had risen to 3.8 per cent.

Appeal Against Reduction of London Tramway Assessments.—In the Court of Appeal, on January 21, the hearing was concluded of the arguments on the appeal of the Islington Assessment Committee against a decision of a Divisional Court, making absolute a rule nisi for a mandamus directing the appellants to appoint a valuer to make a provisional list showing the reduction in the rateable value of the London County Council tramways within the borough of Islington, due to the competition of motor omnibuses. Their lordships reserved judgment.

The British Electrical Federation.—The traffic statement for the week ended January 16, 1914, shows that the receipts from tramways and railways amounted to £35,769, as compared with £34,998 in the corresponding week last year, and from omnibuses £11,340, as compared with £1,249, making a total of £47,109, as compared with £36,247. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year, the receipts show an increase of £673 upon the week.

London Electric Amalgamation Scheme.—Thirteen companies are affected by the scheme for an amalgamation of the London Electrical Supply Companies. The new company designed to control the undertakings will, according to present arrangements, create £4,500,000 of new A 4½ per cent. Debentures, this sum being required for the provision of works, lands, transmission mains, connecting mains, distributing mains for railway supply, and other purposes. The new company will be capitalised with £6,000,000 of cumulative 6 per cent. preference shares and £4,000,000 of ordinary shares. Under the improved system of administration and working which it is hoped to introduce, it is expected that the earnings will be doubled. About two and a half years will be required to develop and organise the new company.

WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended January 17 amounted to £213,933, or £7,461 more than in the corresponding week last year, while the track mileage was 2,862, or 80 more than for the corresponding week. The receipts were at the rate of £74 14s. 11d. per track mile, an increase of 10s. 1d. per mile as compared with last year.

(Continued from page 74.)

COUNTY BOROUGH OF WEST HAM.

TENDERS FOR SUPPLIES, ETC.

The Council hereby invite tenders for the supply of
Engine Room Stores.
House Service A.C. Wattmeters.
Electrical Fittings and Accessories.
I.R. Covered Wires and Cables.

Forms of tender and further particulars may be obtained of the Electrical Engineer, 84, Romford Road, Stratford, E.

A deposit of £1 will be required in respect of each form of tender, which will be returned on receipt of a *bonâ-fide* tender.

Note.—No tender will be considered unless the same is delivered at the Office of the Town Clerk, Town Hall, West Ham, E., in the envelope supplied, by registered post, not later than 12 o'clock noon on Friday, February 6, 1914.

The tenders will be opened at the Town Hall, West Ham, at 6.30 p.m. on Friday, February 6, 1914, and persons tendering may be present if they so desire, but no guarantee is given that any information, beyond the names of persons tendering, will be read out.

The Council do not bind themselves to accept the lowest or any tender. The contractor will be required to enter into a bond, with sureties, for the due performance of the contract, and no goods, materials, etc., will be ordered under the contract until such bond has been duly executed.

The contractor whose tender is accepted, and with whom a contract is entered into, will be required to pay to the whole of his workmen such rate of wages, and observe such hours of labour as are recognised by the Workmen's Trade Unions, and in force at the time of signing the contract. In the event of any breach of such agreement the Council will enforce the penalty clauses in their entirety.

By order of the Council,
H. W. GREAVES,
Town Clerk.

Town Hall, West Ham, E.,
January, 1914.

METROPOLITAN BOROUGH OF ISLINGTON.

Tenders are invited for the supply and delivery of Jarrah, or other Hardwood, and Creosoted Deal Paving Blocks.

Form of tender and particulars can be obtained upon application to the Borough Engineer, Mr. J. Patten Barber, at the Town Hall, Upper Street, Islington, N.

Sealed tenders, endorsed "Tender for Wood Blocks," must be received by the undersigned not later than 4 p.m. on Tuesday, January 27, 1914.

The Council do not bind themselves to accept the lowest or any tender.

WM. F. DEWEY,
Town Clerk.

Town Hall, Upper Street, N.,
January, 1914.

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CITY OF NOTTTINGHAM.

TRAMWAYS DEPARTMENT.

UNIFORM CLOTHING.

The Tramways Committee are prepared to receive tenders for the supply of various articles of Clothing for the Motormen, Conductors, and Inspectors for the ensuing year.

Specifications and form of tender may be obtained from Mr. John Aldworth, General Manager, Beastmarket Hill, where samples of the various articles may be seen. All articles must be according to patterns. The cloth to be shrunk before being made up.

Sweating in any form will be disallowed in connection with the execution of the contract, and the contractor will be required to pay the local standard rate of wages to all workmen employed by him.

The Committee will not consider any tender except those on the authorised form, which must be sent to the Chairman, Tramways Committee, Beastmarket Hill, Nottingham, in the official envelope provided, not later than Wednesday, February 7, accompanied with sample of cloth. A number or mark—not a name—and the price to be fixed to each sample.

The Tramways Committee will not bind themselves to accept the lowest or any tender.

J. BOARD,
Town Clerk.

Guildhall, Nottingham,
January 24, 1914.

THE MADRAS AND SOUTHERN MAHRATTA RAILWAY COMPANY, LTD.

The Directors are prepared to receive tenders for :—

(1) About 2,740 Tons Steel Rails,
(2) About 134 Tons Steel Fish-Plates.

in accordance with the specifications, which may be seen at the offices of the Company. The charge for each specification is one guinea. which will not be returned.

Tenders must be sent in. addressed to the Secretary, not later than 2.p.m. on Tuesday, February 3, 1914, marked "Tender for Rails," or "Fish-plates," as the case may be.

The Directors do not bind themselves to accept the lowest or any tender.

H. BONHAM-CARTER,
Secretary.

Company's Offices,
91, York Street, Westminster, S.W.,
January 20, 1914.

PONTYPRIDD URBAN DISTRICT COUNCIL.

ELECTRIC LIGHT AND TRAMWAYS DEPARTMENT.

The above Council invite tenders for the supply of the following Stores and Materials for the year ending March 31, 1915 :—

1. Installation Stores and Sundries.
2. Joint Boxes and Service Cut-Outs.
3. Tramcar Equipment.
4. Tramways Overhead Equipment.
5. Glass and Globes.
6. Cables and Wires.
7. Insulating Material.
8. Meters.

Forms of tender and conditions may be obtained on application to the Electrical Engineer. Generating Station, Treforest, Pontypridd.

Tenders, on the prescribed forms, sealed and endorsed "Tender for ————" (as the case may be), must be received by the undersigned on or before Monday, the 9th day of February, 1914.

The Council do not bind themselves to accept the lowest or any tender.

J. COLENSO JONES,
Clerk to the Council.

Municipal Buildings, Pontypridd,
January 17, 1914.

POSITIONS VACANT.

COUNTY BOROUGH OF SOUTHAMPTON.

WORKS SUPERINTENDENT.

Applications are invited for the position of Works Superintendent in the Tramways Department at a commencing salary of £150 per annum, rising by annual increments of £10 to a maximum salary of £200 per annum.

The person appointed will be required to act as engineering assistant to the Tramways Manager in connection with the rolling stock, overhead line, and permanent way. Experience in the organisation of Car Depôt work will be specially taken into consideration.

Applications, giving particulars of previous experience, present occupation and age, together with copies of not more than three recent testimonials, to be sent to the Town Clerk on or before the 31st instant, endorsed "Works Superintendent."

R. R. LINTHORNE.
Town Clerk.

Town Clerk's Office,
Municipal Offices, Southampton,
January 15, 1914.

SINGAPORE ELECTRIC TRAMWAYS, LTD.

ASSISTANT ELECTRICAL ENGINEER.

Singapore Electric Tramways, Limited, invites applications for the appointment of an Assistant Electrical Engineer for their tramway undertaking in Singapore. Candidates should not be less than 25 years of age, and must have had 3 years' general experience in operating electric tramways, including laying and maintenance of tramway tracks, maintaining underground feeders and locating faults on the same, and erection and maintenance of overhead construction. Car shed experience is also desirable. Candidates should also possess a good technical education, and will be required to pass a medical examination as to fitness. The appointment will be for 4 years at a salary of $300 per month for the first two years, and $350 per month for the remainder of the term ($ = 2s. 4d.).—Apply, by letter only, giving full particulars of education and experience, with copies of testimonials, if any, to the Secretary, Singapore Electric Tramways, Limited, 19, St. Swithin's Lane, London, E.C.

COPPER AND ALUMINIUM MARKET.

January 23, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

	Friday, January 23.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	65 12 6	63 11 6	69 10 0
,, ,, (three months)	65 17 6	64 0 0	69 15 0
Electrolytic Copper—bars or ingots ..	67 10 0	65 10 0	75 10 0
Aluminium—bars or ingots	83 0 0	83 0 0	90 0 0

COAL MARKET.

January 23, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

	Friday, January 23.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	s. d.
Best Admiralty Welsh (large)	23 6	23 9	25 0	24 6
Best Seconds	23 0	23 3	24 3	23 9
Ordinary Drys	21 6	21 9	23 3	22 0
Best Washed Nuts	21 0	21 0	21 9	21 3
Best Washed Peas	19 6	19 6	20 3	18 9
Cardiff, f.o.b.—				
Best Admiralty (large) ..	19 0	19 3	19 9	19 6
Best Seconds	18 6	18 9	19 0	18 9
Ordinary Drys	17 0	17 3	18 0	17 3
Best Washed Nuts	16 6	16 6	16 6	16 3
Best Washed Peas	15 0	15 0	15 0	13 9
Newcastle, f.o.b.—				
Best Steams	14 6	15 0	15 6	14 0
Best Seconds	12 6	12 6	14 6	13 3
Smalls	6 9	6 9	11 3	9 3

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregate. Wks.	Aggregate. 1913-4.	Increase or Dec.
Anglo-Argentine	Jan. 14	£55,588	£58,200	2	£118,267	+ £3,524
Auckland..... (28 days)	Dec.	20,556	17,651	25	109,905	— 7,854
Ballarat and Bendigo	Nov.	4,799	3,737	34	80,725	— 711
Brazilian St. Rly. Mlrs	Nov.	44,278	53,642	17	207,214	+ 35,573
Brazilian Traction.....	Jan. 10	85,385	95,230	2	189,723	+ 19,224
Brisbane	Dec.	25,890	29,145	52	316,216	+ 61,905
British Columbia ..... $	Nov.	741,876	746,152	22	3,760,527	+ 283,424
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacroze..	Dec.	47,183	47,624	26	272,894	+ 9,337
Calcutta.....Rs.	Jan. 17	66,778	69,754	3	2,12,858	+ 3,000
Cape Town	Dec.	...	14,925	...	...	...
Carthagena & Herreria	Dec.	3,001	2,698	52	30,863	+ 4,517
Cordoba.....	Nov.	12,193	13,447	35	107,457	+ 10,471
East India	Dec.	1,842	2,046	22	9,879	+ 349
Kalgoorlie.....	Dec.	3,206	2,907	52	34,510	— 8,300
La Plata.....	Dec.	5,862	5,680	52	61,520	+ 9,344
Lima.....	Sept.	22,660	34,110	39	300,647	+ 23,783
Lisbon ..... Mlrs.	Sept.	...	144,538	...	...	...
Madras (14 days) Rs.	Jan. 15	26,000	29,303	2	29,303	+ 2,713
Melbourne	Dec.	...	69,000	...	...	...
Mexico ..... $	Dec.	633,102	611,673	52	6,813,046	+ 136,482
Montevideo.....	Dec.	34 483	33,309	9	68,839	— 267
Para	Jan. 18	4,120	3,121	7	23,582	— 4,533
Port Elizabeth.....	Dec.	...	4,967	...	...	...
Shanghai .....$	Jan. 14	18,232	23,400	2	46,600	+ 8,190
Singapore ..... $	Jan. 17	11,232	11,646	3	34,317	+ 1,791
Toronto .....$	Nov.	742,156	849,279	48	8,893,984	+1,176,620
Winnipeg.....$	Nov.	315,031	360,082	48	3,698,831	+ 295,148

DICK, KERR & CO.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1912-3.	1913-4.	Incr. or Dec.	Aggregate. Wks.	1913-4.	Increase or Dec.
Aberdeen Corporation..	Jan. 14	£1,489	£1,459	— £29	33	£54,012	+ £3,191
Accrington Corp.....	,, 14	440	516	+ 76	41	23,830	+ 2,169
Ayr Corporation	,, 17	183	207	+ 24	35	13,923	+ 1,972
Bath Electric	,, 14	719	692	— 27	2	1,387	— 186
Birkenhead Corp.	,, 18	1,123	1,142	+ 19	42	54,357	+ 5,026
Birmingham Corp.	,, 17	11,343	11,842	+ 499	43	498,366	+ 43,429
Blackburn Corporation	,, 14	966	1,107	+ 141	42	55,402	+ 5,046
Blackpool Corporation	,, 15	426	460	+ 34	41	78,011	+ 12,256
Bolton Corporation	,, 18	2,430	2,456	+ 26	42	115,349	+ 6,499
Bournemouth Corp.....	,, 21	1,506	1,394	— 112	42	58,520	+ 9,835
Bradford Corporation...	,, 17	5,104	5,728	+ 624	41	248,598	+ 14,990
Brighton Corporation...	,, 18	773	729	— 44	42	46,468	+ 2,937
Bristol	,, 16	6,871	7,319	+ 448	2¼	17,380	+ 269
British Elec. Federatn.	,, 16	36,247	47,109	*	...	...	...
Burnley Corporation ...	,, 17	1,503	1,595	+ 92	42	71,733	+ 7,288
Burton-on-Trent Corp.	,, 18	263	270	+ 7	42	12,162	+ 626
Bury Corporation.....	,, 18	1,223	1,260	+ 37	42	56,853	+ 2,211
Cardiff Corporation.....	Dec. 27	2,733	2,942	+ 209	39	107,267	+ 11,181
Chatham and District..	Jan. 15	831	795	— 36	2	1,723	— 242
Chesterfield Corp.	,, 15	211	237	+ 26	41	10,818	+ 1,233
Colne & Trawden.....	,, 17	212	225	+ 13	3	674	+ 39
Cork Electric.....	,, 15	432	434	+ 2	2	948	— 81
Croydon Corporation ...	,, 9	1,537	1,504	— 33	40	67,497	— 6,233
Darlington Corporation	,, 14	217	233	+ 16	42	10,507	+ 976
Derby Corporation	,, 17	888	875	— 13	42	41,362	+ 3,840
Dover Corporation	,, 17	193	171	— 22	42	10,421	+ 118
Dublin & Lucan	,, 16	107	110	+ 3	2	259	— 14
Dublin United	,, 16	5,515	4,972	— 543	3	11,703	— 1,273
Dundee City	,, 21	1,167	1,194	+ 27	36	47,435	+ 3,317
East Ham Corporation	,, 17	1,129	990	— 139	42	43,396	— 1,994
Exeter Corporation	,, 16	284	269	— 15	43	14,455	+ 637
Gearless Motor 'Buses.	,, 17	...	430	...	3	1,155	...
Glasgow Corporation ...	,, 17	18,007	19,324	+ 1,317	33	673,582	+ 48,253
Glossop(U.Elec.Supply)	,, 17	102	111	+ 9	3	348	— 10
Halifax Corporation ...	,, 13	1,604	1,774	+ 171	41	87,533	+ 3,132
Hastings & District.....	,, 14	715	640	— 75	2	1,360	— 121
Huddersfield Corp.	,, 17	1,920	1,969	+ 49	41	89,464	+ 4,608
Hull Corporation	,, 17	3,017	3,249	+ 232	42	132,904	+ 6,951
Ilford U.D.C.	,, 17	422	395	— 27	42	18,965	— 968
Ilkeston Corporation ...	,, 21	114	117	+ 3	43	5,688	+ 835
Ipswich Corporation ...	,, 17	362	336	— 26	42	19,394	+ 702
Isle of Thanet	,, 17	274	250	— 24	16	5,605	+ 476
Kilmarnock Corp.	,, 17	144	149	+ 5	35	6,265	+ 415
Lanarkshire	,, 15	1 350	1,645	+ 295	2	4,289	+ 254
Lancashire United	,, 14	1,126	1,401	+ 275	2	3,093	+ 451
Leeds City	,, 17	7,137	7,596	+ 459	42	340,228	+ 13,728
Leicester Corporation...	,, 17	2,662	2,696	+ 34	3	6,773	+ 537
Leith Corporation	,, 17	612	641	+ 29	35	25,202	+ 1,158
Leyton U.D.C.	,, 1	1,288	1,309	+ 21	29½	53,427	— 362
Liverpool Corporation..	,, 17	12,049	12,322	+ 273	2	31,387	+ 1,420
Llandudno & Colwyn B.	,, 16	140	139	— 1	7	1 032	— 10
London County Council	,, 14	40,825	41,749	+ 924	40	1,746,997	+ 5,912
London Gnl. Omnibus..	,, 17	52,658	51,237	— 1,421	3	153,792	— 6,285
London United	,, 16	5,279	5,202	— 77	3	13,162	— 317
Lowestoft Corporation	,, 17	149	163	+ 14	15	2,949	+ 236
Maidstone Corporation	,, 8	164	171	+ 7	41	8,457	+ 597
Manchester Corp.....	,, 17	16.110	16,558	+ 448	43	737,478	+ 33,136
Met. Elec. Trys.	,, 16	8,431	8,271	— 160	3	18,935	— 56
Nelson Corporation.....	,, 17	181	185	+ 4	42	8,810	+ 503
N'castle-on-Tyne Corp.	,, 17	4,239	4,874	+ 615	42	206,455	+ 18,846
Newport (Mon.) Corp....	,, 17	696	692	— 4	43	32,401	+ 2,404
New St. Helens & Dist...	,, 14	604	683	+ 79	29	23,944	+ 2,297
Northampton Corp	,, 16	504	503	— 1	42	24,220	+ 1,495
Nottingham Corp.	,, 15	2,917	3,217	+ 300	41½	139,493	+ 6,305
Oldham Corporation ..	,, 18	1,971	2.071	+ 100	43	95,056	+ 6,784
Portsmouth Corp.....	,, 17	1,840	1 697	— 143	42	96,136	+ 6,378
Preston Corporation ...	,, 14	759	749	— 10	43	37,111	+ 2,231
Provincial	,, 17	1,618	1,641	+ 23	15	27,169	+ 1,668
Reading Corporation ..	,, 15	626	637	+ 11	41	29,178	+ 2,192
Rochdale Corporation ..	,, 17	1,356	1,462	+ 106	42	67,451	+ 2,849
Rotherham Corp.....	,, 21	835	957	+ 122	42	42,821	+ 0,106
Salford Corporation ...	,, 19	4,754	4,935	+ 181	42	220,400	+ 10,159
Sheffield Corporation...	,, 18	6,938	7,181	+ 243	43	315,223	+ 23,631
Southampton Corp.....	,, 14	1,199	1,173	— 26	41	55,095	+ 3,184
Southend-on-Sea Corp	,, 14	523	609	+ 86	42	39,963	+ 6,880
South Met. Trys.	,, 16	721	948	+ 227	3	2,248	+ 562
South Shields Corp.....	,, 17	631	650	+ 19	42	30,346	+ 3,531
Sunderland Corp.....	,, 18	1.247	1.270	+ 23	42	60,932	+ 5,672
Sunderland District ...	,, 14	402	481	+ 79	11	6.216	+ 683
Swindon Corporation ...	,, 21	143	134	— 9	42	7,069	+ 400
Trys. (M.E.T.) 'Buses	,, 17	...	7,746	...	3	19.677	..
TynesideTrys.&Tmrds	,, 14	355	422	+ 67	2	832	+ 22
Wallasey Corporation	,, 17	934	1.009	+ 75	42	51.360	+ 4.677
Walsall Corporation ...	,, 17	585	579	— 6	3	1 466	— 49
Walthamstow U.D.C....	,, 17	623	658	+ 35	42	31,456	+ 1,204
Warrington Corp	,, 1	469	463	— 6	40	17,732	+ 473
West Ham Corporation	,, 15	2,616	2 605	— 11	41	113.433	+ 3.350
Wigan Corporation	,, 15	1,210	1,396	+ 186	41½	62,123	+ 5,897
Wolverhampton Corp	,, 21	1,007	963	— 44	43	46.280	+ 2,309
Yorkshire (W. Riding)	,, 18	1,134	1,368	+ 184	3	4,028	+ 316

* From such of the services as were working both last year and this year the receipts show an increase of £373 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London.....	Jan. 17	£5,780	£5,415	— £365	3	£15,883	— £1,001
City and South London	,, 17	3 222	2,948	— 274	3	8,883	— 528
Liverpool Overhead.....	,, 18	1,577	1,672	+ 95	3	5,127	+ 192
London Electric.....	,, 17	15.420	15,300	— 120	3	45.160	— 65
Mersey	,, 17	2.266	2,248	— 18	3	6.801	— 17
Metropolitan	,, 18	16,798	18,231	+ 1,433	3	54,861	+ 4,593
Metropolitan District	,, 17	13,579	13.476	— 103	3	40.042	— 127

The Tramway & Railway World can be obtained, post free, at the following rates:—

For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.

For places abroad—Thirty Shillings per annum.

Tel. No.: 2948 Gerrard.
Telegraphic Address: "Tramigro," London.

AMBERLEY HOUSE, NORFOLK ST., W.C.

TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, January 23.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	72 — 75
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	+ ⅛	4⅛ — 5⅛
5	Do. 5½% Cum. 2nd Pref.	+ ⅛	4⅛ — 4⅜
100	Do. 4% Deb. Stk. Red.....	...	89 — 91
100	Do. 4½% Deb. Stk. Red.....	...	96 — 98
100	Do. 5% Deb. Stk. Red.....	...	97½ — 99½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	+ 2	102 —105
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅜ — ⅝
1	Do. 5% Cum. Pref	...	⅝ — ¾ xd
100	Do. 4½% 1st. Mort. Deb. Stock, Red.....	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	...	84 — 86
10	Blackpool and Fleetwood Tramroad Co.	...	13½ — 14
	Bombay Elec. Supply and Trams. Co., Ord.	+ ⅛	13⅜ — 14⅛
10	Do. do. 6% Cum. Pref.....	...	11 — 11½
100	Do. do. 4½% Db. Stk Rd.	+ 1½	93½ — 95½
$100	Brazilian Traction Light and Power Co. Lim.....	+ 5½	88 — 90
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	...	7½ — 8½
5	Do. do. 5% Cum. Pref	...	4¾ — 5⅜
100	Do. do. 4½% 1st Deb Stock, Red. ...	...	97 —100
10	Bristol Tramways and Carriage Co.	...	5½ — 6
10	Do. do. 4% Cum. Pref.	...	6¼ — 7
100	Do. do. 4% Deb. Stock	...	100 —102
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	+ 8	110 —114
100	Do. Pref. Ord. Stock	+ 4	105 —109
100	Do. 5% Cum. Perpetual Pref. Stock.....	+ 3½	102 —105 xd
100	Do. 4½% 1st Mort. Debs.	...	98 —101
40	Do. 4½% Vancouver Power Debs.....	...	94 — 98 xd
100	Do. 4½% Perpetual Cons. Deb. Stk.	...	91 — 94
100	British Elec. Traction Co., Lim., 6% Cum. Pref.....	...	88 — 91
100	Do. 7% Non-Cum. Pref.	...	52 — 55
10	Do. 6% Pref. Ord. Non-Cum.	...	12 — 14
100	Do. Deferred Ord. Stock	...	4½ — 6
100	Do. 5% Perpetual Debenture Stock.....	...	92 — 93
100	Do. 4½% Second Debenture Stock, Red	...	76 — 79
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	—14	70 — 75
100	Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb.	...	100 —102
5	Calcutta Tramways Co., Limited. Ord.	...	6 — 6½
5	Do do. 5% Cum. Pref.	...	4⅛ — 5⅛
100	Do. do. 4½% 1st Deb. Stock, Red.	...	96 — 99
1	Cape Electric Tramways, Ld., ...	+ 1/32	5/8 — ¾
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	3 — 3¼
100	Do. 5% Debs. Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co. (1904), Lim.	+ 1/16	5⅛ — 5⅜
100	Do. 4% Debenture Stock Red, 1935	...	91 — 96
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. ...	+ 1	89 — 93
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	+ 1½	96 — 97
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	— 8
10	Dublin United Trams. Co. (1896) Lim. Ord.	...	— 11
10	Do. do. 6% Pref.	— 1/16	— 12⅛
100	Do. do. "A" Red.	...	— 80¾
100	Do. do. Deb. Stock "B" Red. ...	...	— 77
10	Gateshead & Dist Trys. Co., Ord.	...	8¾ — 9¼
10/-	Hastings & Dist. Electric Trams. Co., Ld., Ord.	...	½ — ⅝
1	Do. do. 6% Cum. Pref.	...	⅛ — ¼
100	Do. do 4½% Deb. Stk. Red.	...	66 — 71
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	+ 1½	93½ — 97½ xd
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.).....	...	85 — 90
10	Imperial Tramways, Ord.	...	3½ — 4¼
10	Do. do. 6% Cum. Pref.....	...	6¼ — 6½
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref....	...	2 — 2½
100	Do. 4% Debenture Stock	...	71 — 76
1	Kalgoorlie Elec. Trams., Ltd.	...	0 — 1/16
100	Do. do. 5% "A" Deb. Stk.	...	85 — 90
100	Do. do. 6% "B" do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.....	...	¾ — 1
10	Lanarkshire Tramways Co.	...	9¼ — 10¼
100	Lancashire United Tramways. 5% Prior Lien Deb.	...	77 — 81
1	Lisbon Electric Trams., Lim., Ord.....	...	1⅛ — 1⅜
1	Do. 6% Cum. Pref.	...	1⅛ — 1⅛
100	Do. 5% Mort. Debs.	...	91 — 96
1	London and Suburban Trac. Co., Lim., Ord.	...	¼ — 5/16
100	London General Omnibus Company, Limited, 4½% Deb.	+ ⅛	95 — 97
100	Do. Do 5% Cum. Inc. Deb. Stk. Red.	+ 3	89 — 91
100	London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red	+ 5	64 — 68
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref.....	...	4⅜ — 5¼
5	Do. do. 5% Deb. Stk., Red.	...	92 —101
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	79 — 83
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	+ 2¼	111 —114
$1,000	Do. do. 5% Bds.	...	96½ — 98½
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	⅞ — 1
100	Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. ...	...	80 — 84
100	Do. 5% Deb. Stock, Red. ...	...	86 — 89
100	Mexico Tramways Co., Common Stock	+ 9	71 — 74
500	Do. Gen. Con. 1st Mort. Gld. Bonds	+ 7½	81 — 85
100	Do. 6% 50-yr. Mort. Bonds	+10½	81½ — 84½
...	Michigan United Railways 5% 1st Mort. Gld. Bonds ...	+ ⅛	91½ — 93½
100	Montreal Street Railway, Sterling 4½% Debs. (1922).....	...	99 —101
100	Do. 4½% Sterling Debs, (1923) ..	...	98 —100
1	National Steam Car Co. Ltd.	+ 1/32	3/32 — 5/32 xd
10	Oldham—Ashton and Hyde Elec. Ord.	...	5¾ — 6½
10	Do. do. 5% Cum. Pref.	...	5¾ — 6½
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	5 — 5½
5	Do. do. 6% Cum. Pref.	...	4½ — 4⅝
1	Perth (W.A.) Elec. Trams. Ld., Ord.....	...	1½ — 1⅜
1	Potteries Electric Traction Co., Ltd., Ord.	+ 1/16	⅜ — ½
1	Do. 5% Cum. Pref.	...	5/16 — 7/16
100	Do. 4½% Debenture Stock, Red.	...	84 — 87
1	Provincial Tramways, Lim.. Ord.	...	3/32 — 5/32
10	Do. 5% 1st Deb. Stock	...	93 — 98
...	Puebla Tramway, Light & Power Co., Prior Lien 5% ...	...	76 — 80
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.....	...	5 — 5½
100	Do. do. 4½% 1st Mt. Db. Stk.	...	94½ — 96½
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	+ 3	87 — 90
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	+ 2	99 —101
100	Do. do. 5% 50-yr. Mort. Gold Bonds	+ 3½	93½ — 94½
100	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	+ 2	98 —101
$500	Do. 5% 1st Mort. Debs., Red., 1939	...	100 —103
10	Shanghai Elec. Construction Co.	+ ¼	10¼ — 11¼
100	Singapore Elec. Tramways Lim., 5% Debs. Red	+ 1	87 — 91
100	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ...	...	⅛ — ¾
	Do. do. 4% Deb. Stk.....	...	66 — 70
...	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	+ 2	98 —100
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	97 — 99
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	83 — 86
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	93 — 96
5	United Elec. Tramways of Monte Video, Ord.....	— ⅛	4¼ — 4⅝
5	Do. do. 6% Cum. Pref.	+ ⅛	4⅞ — 5⅛
100	Do. do. 5% 1st Deb. Stk. Red.	+ ⅛	94 — 97
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	93 — 97
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	8¾ — 9¼
5	Do. do. 6% Cum. Pref.	+ ¼	8¾ — 9¼
100	Do. do. 4½% 1st Deb. Stock. Red.....	— 1	79 — 84

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THE

Tramway & Railway World

Vol. XXXV. No. 6.] LONDON, SATURDAY, JANUARY 31, 1914. [Established in 1892.

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone; No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF BLACKBURN.

ELECTRICITY DEPARTMENT.

The Electricity Committee invite tenders for the supply of the following Materials for the year ending March 25, 1915:—

Section 1. General Stores, Waste, Sponge Cloths, Packing, Asbestos, Rope, etc.
Section 2. Iron Castings, Bolts, Woodscrews, Nails, Washers, etc.
Section 3. Timber.
Section 4. Insulating Material.
Section 5. Tools, Taps, etc.
Section 6. House Service Fuse Boxes, Switches, etc.
Section 7. Motors.
Section 8. Motor Starting Switches.
Section 9. Screwed Tube for Inside Wiring.

Specifications and forms of tender may be obtained upon application to the undersigned on and after Saturday, January 31, 1914, on payment of a deposit of three shillings per section, which will be returned on receipt of a *bonâ-fide* tender in that section.

Extra copies of any section may be purchased at the rate of one shilling per section.

The successful tenderers may be required to sign a stamped contract form, drawn up by the Town Clerk, agreeing to the general conditions enforced by the Corporation.

Sealed tenders to be endorsed with the section number, addressed to the "Chairman of the Electricity Committee," and delivered at the Town Hall, Blackburn, not later than 12 o'clock mid-day on Saturday, February 14, 1914.

The Committee do not bind themselves to accept the lowest or any tender.

F. P. WHEELWRIGHT, M.I.E.E.,
Borough Electrical Engineer.

Corporation Electricity Works,
Jubilee Street, Blackburn,
January 27, 1914.

COUNTY BOROUGH OF BLACKPOOL.

TRAMWAYS DEPARTMENT.

TENDERS FOR UNIFORMS.

The Tramways Committee invite tenders for the supply and delivery of Uniform Clothing for the Traffic Staff for the twelve months ending March 31, 1915.

Specification and forms of tender may be obtained upon application to the undersigned, and sample garments may be seen at the Traffic Superintendent's Office, Blundell Street Depôt. Tenders, in sealed envelopes, endorsed "Tenders for Tramway Uniforms," and addressed to the Chairman, Tramways and Electricity Committee, West Caroline Street, Blackpool, to be received not later than February 18, 1914.

The Corporation do not bind themselves to accept the lowest or any tender.

CHARLES FURNESS,
General Manager.

General Offices,
West Caroline Street, Blackpool,
January 26, 1914.

LEEDS CITY TRAMWAYS.

The Tramways Committee of the Leeds City Council are prepared to receive tenders for the supply of the following Material during the year ending March 31, 1915:—

(1) Bolts, Nuts, and Washers.
(2) Brushes (including Paint Brushes).
(3) Cotton Waste, Wipers, and Sponge Cloths.
(4) Chemicals, Acids, etc.
(5) Electrical Sundries.
(6) Engineers' Furnishings (Drills, Pliers, and other Tools).
(7) Files.
(8) Glass.
(9) Iron and Steel.
(10) Iron and Steel Castings.
(11) Ironmongery.
(12) Malleable Iron Castings.
(13) Oils, etc.
(14) Paints, Varnishes, and Transfers.
(15) Plumbers' Material (including Tubes and Fittings).
(16) Ropes, Twines, and Sand Bags.
(17) Soaps and Metal Polish.
(18) Tool Steel.
(19) Springs.

Offerers are required for the purchase of Scrap Metal (including Copper, Brass, Iron, and Steel).

Tenders are also required for—

(1) Steam Coal (Single Nuts, Beans, Peas, and Slack) required for the Generating Station, delivered in barges at Crown Point. Offerers may tender for six, nine, or twelve months' supply, and for the whole or part thereof.

(2) The supply of Household and Tar Pan Coal, delivered at the various offices and depôts as required.

(3) Sand, which must be clean and sharp, delivered in boats alongside River Wharfe, Sovereign Street.

Also
Tie Bars.
Fish Bolts.
Cement.
Copper Bonds.
Cartage.

Conditions of contract and tender forms may be obtained on application to the undersigned.

Sealed tenders, marked "Tramways—Tender for Bolts, Nuts, and Washers," as the case may be, to be delivered to the undersigned, at the Tramways Office, City Square, Leeds, not later than 10 a.m. on February 16, 1914.

J. B. HAMILTON,
General Manager.

Tramways Offices, City Square, Leeds.

BALLYCONNELL ELECTRIC LIGHT AND POWER COMPANY.

The Ballyconnell (Co. Cavan) Electric Light and Power Co. invite tenders for the following works in connection with the electric lighting of the town:—

Section I.—Horizontal Gas Engine and Suction Plant.
,, II.—18 kw. Dynamo and Motor Dynamo.
,, III.—Storage Battery and Accessories.
,, IV.—Switchboard and Connections.
,, V.—Overhead Mains and Street Lamps.

Copies of specifications, general conditions, and plans as prepared by Mr. Louis J. Lawless, Consulting Engineer, Dublin, may be seen on application to the undersigned at Ballyconnell by appointment, or separate copies will be supplied at the cost of production. Tenders will be considered for any section or sections, but not for part of a section. Tenders, sealed and endorsed, "Tender for Electric Lighting," must be delivered to the Secretary, The Ballyconnell Electric Light and Power Co., on or before the 14th of February prox.

The Company do not bind themselves to accept the lowest or any tender.

JAMES F. O'KANE,
Secretary.

Ballyconnell,
January 26, 1914.

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CITY AND COUNTY BOROUGH OF BELFAST.

ELECTRICITY DEPARTMENT.

STORES.

The Tramways and Electricity Committee invite tenders for twelve months' supply (commencing April 1, 1914) of the undermentioned Materials :—

SECTION NO. 1.

SUB-SECTION :—
1. Lubricator and Gauge Glasses.
2. Packings, Waste, White Rags, etc.
3. Oils.
4. Rubber Goods.
5. Bricks, Firebricks, and Fireclay.
6. Tools.
7. Incandescent Lamps.
8. Asbestos Goods.
9. Solder.

SECTION NO. 2.

SUB-SECTION :—
1. Trolley Wire.
2. Overhead Line Material.
3. Galvanized Wires.

SECTION NO. 3.

Vulcanized Bitumen Insulated Cable.

SECTION NO. 4.

SUB-SECTION :—
1. Refined Trinidad Bitumen.
2. Bitite Strip, Prepared Tape, and Rubber Tape for Joints.
3. Joint Box Compound.
4. Fuse Wires.
5. Wood Troughing.
6. Stoneware Troughing.
7. Cast-iron Street Box Frames and Covers.
8. Glazed Stoneware Conduits.
9. Cast and Wrought Iron Pipes.
10. Lighting, Feeder, and Section Pillars.
11. Glazed Stoneware or Glass Cable Bridges.
12. Copper Cable Connectors.
13. Arc Lamp Carbons.

SECTION NO. 5.

SUB-SECTION :—
1. Electricity Meters.
2. Electricity Maximum Demand Indicators.
3. Automatic Time Switches.
4. House Service Cut-outs.

Form of tender of any of the 5 sections and further particulars may be obtained from Mr. T. W. Bloxam, City Electrical Engineer, East Bridge Street, Belfast, on payment of 10s. per section, which will, after the Council or their Committee have come to a decision on the tenders received, but not before, be returned to the tenderer, provided he shall have sent in a *bonâ-fide* tender, and shall not have withdrawn the same.

The whole or any part of a tender sent in may be accepted, and tenders shall be open for acceptance until May 1 next.

Tenders, endorsed "Tender for Stores, Electricity Department," to be lodged in my office not later than 10 a.m. on Monday, February 23, 1914.

A tender, if sent by post, must be registered; if delivered, an official receipt must be obtained for it, otherwise the undersigned will not be responsible.

The Council do not bind themselves to accept the lowest or any tender.

R. MEYER,
Town Clerk.

City Hall, Belfast.

(Continued on page 85.)

E&RC

POLE PAINTS

As supplied to important Companies at home and abroad. Durable, ready-mixed, permanent colours that defy rust and exposure. Samples and prices on request.

Robert KEARSLEY & Co., Ltd.
RIPON, England.

SIMPLEX CONDUITS, Ltd.

GARRISON LANE, BIRMINGHAM.

Makers of Simplex Steel Conduit System and

WIRES and CABLES.
BITUMEN CABLES.
TRAMCAR HEATERS.
TRAMCAR METERS.

MEASURING INSTRUMENTS.
WATERTIGHT FITTINGS FOR CAR SHEDS.
ENCLOSED (Indicating) FUSES (to N.E. Code or English Standard).

500 page Catalogue sent free on request.

TRAMWAY SUPPLIES, Ltd.,

Tramway Engineers,

Sole Selling Agents for S. Dixon & Sons' Tramway Material,

160, WOODHOUSE LANE, LEEDS.

Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.

Telegrams: "Controllers, Leeds." Telephone: 3488 Leeds.

OVERHEAD LINE MATERIAL AND SUPPLIES.

MILLARS' TIMBER AND TRADING CO., LTD.

PINNERS' HALL, GREAT WINCHESTER STREET, LONDON, E.C.

SUPPLY

JARRAH

THE SANITARY WOOD PAVING

REGISTERED TRADE MARK. M.J.

Telegrams: "JARRAH. LONDON."

Telephone: 368. LONDON WALL.

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SPECIAL

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PINCHIN JOHNSON & CO., Ltd.,

MINERVA HOUSE,

BEVIS MARKS, LONDON, E.C.

The "Peacock" Improved Brake.

THE "PEACOCK" BRAKE CO.,

27, CLEMENTS LANE, LONDON, E.C.

Telephone No.: 5735 CENTRAL.

Telegraphic Address: "INBRAKE," LONDON.

British, Foreign and Colonial Representatives:—

BRITISH ISLES. W. C. Knight, 75, Surrey Street, Sheffield. Wm. C. Yuille & Co., 60, Brown St., Anderston, Glasgow. Equipment & Supplies, Ltd., 7, Anglesea Street, Dublin.

FRANCE. Chas. d'Albert, 15, Avenue Larcher, Chatou (S & O).

GERMANY. Heinrich Vellguth, 1, Glockengies-serwall, Hamburg.

BELGIUM. l'Anglo-Belge Electrique, 72, Avenue de Tervueren, Brussels.

SWEDEN. E. & L. Davidson, Grefmagnigatan 15, Stockholm.

SWITZERLAND. G. Sigerist, 8, Mitti. Haldenstrasse, Winterthur.

ITALY. Chas. de Grave Sells, 5, Via Ponte Calvi, Genoa.

SPAIN. Peninsular Engineering Co., Puerta del Angel 10, Barcelona.

SOUTH AFRICA. F. Peabody Rice, 2', Standard Bank Buildings, Johannesburg.

AUSTRALIA. H. A. E. Rothwell, Cromwell Buildings, Bourke Street, Melbourne, Victoria.

NEW ZEALAND. James Jackson, Box 731, G.P.O., Wellington.

JAPAN. W. M. Rooke & Co., 184, 5 Chome, Nakanoshima, Osaka.

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THE
Tramway and Railway World

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THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
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SATURDAY, JANUARY 31, 1914.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

THE BEST TYPE OF CAR ?

The time has come when tramway managers and engineers would do well to give fresh consideration to the question of what is the best type of car for British city tramways. Most of the cars now in use have seen a good many years' service, so that the question of modifying them or replacing them by others can be considered with a less serious concern for the cost to capital account than would have been the case a few years ago. The maintenance of permanent way becomes of increasing gravity as time goes on. This is in part due to the growth of heavy automobile traffic, but undoubtedly it is also caused by the fact that the steady tendency in this country is to increase the weight of the tramcars. In addition to the increase in weight and strength of bodies and of trucks, we have the very large adoption of top canopies, and now end vestibules are coming into use. While the general increase in car speeds is a factor in accelerating the wear of the rails, there can be no doubt that the growing weight of the cars is also an important element. In the United States also the tendency is to increase weight, and many of the long single-deck cars, designed for high speed on suburban and inter-urban routes, are really ponderous. In this country, however, speeds are not so high as to call for great weight. Americans are also experimenting with double-deck cars, and this means more weight. Mr. Dalrymple, general manager of Glasgow Tramways, in his report on his recent visit to America, says that many of the cities of the United States are groping for the best type of car for dense city traffic, but he thinks there is now a consensus of opinion that the light single-truck, double-deck car, seating about 60 passengers, answers the purpose best of all. If so, practice has not yet followed opinion in America. The Glasgow car in the past certainly was fairly light, but it is now burdened with the weight of a roof-canopy. Distinct from the practice in America and in this country is that on the continent of Europe. There the custom has been to employ a small, light, single-deck car, and, as far as one can judge, the tendency is to make the vehicle still lighter, if possible. Of course, it can be said that those small cars are poor revenue-earners, as their seating capacity is limited. To that it may be replied that such cars take less energy for propulsion, that they are cheap to maintain, and that they are easy on the permanent way. To the objection that the small light car is not capable of handling a large tramway traffic, the reply at once is that whenever necessary a trailer, and sometimes two trailers, are coupled on to the motor-car. Thus the increased carrying capacity is got without that addition to street congestion which would arise by multiplying the number of single cars. At the same time the increased capacity is obtained without increasing the weight on any single axle, and thus there is a minimum rail wear. The trailers, of course, can be much lighter than the motor-cars, and the wheels of trailers, as is well known from horse tramway and cable tramway experience, cause very little wear of the rails. The fact that the ordinary car is a locomotive, that its wheels are driving wheels, is one reason why it wears the rails so much. Then the additional energy required for pulling the trailer is relatively small. In face of the movement now beginning in this country in favour of trail-cars, it would be well for our managers to investigate carefully the results which have been obtained on the Continent with light motor-cars coupled to lighter trailers, alike as regards current consumption, repairs of cars, and maintenance of permanent way per car mile run. Of course, when a motor-car has to haul a trailer, the former must have sufficient weight to secure the necessary adhesion, but weight beyond that might well be done without, so long as mechanical strength is secured. The train of single-deck cars would also lend itself readily to the pay-as-you-enter system, and the trailer (or one of the trailers, if we ever get as far as using two) could be a smoking-car.

TRAMWAYS AND STREET TRAFFIC IN AMERICAN CITIES.

REPORT BY MR. JAMES DALRYMPLE
(General Manager, Glasgow Corporation Tramways).

There was issued on January 24 a long report by Mr. James Dalrymple, general manager of the Glasgow Corporation tramways, on the visit which he and the master of works paid to the United States and Canada last autumn. The report, which is described by Mr. Dalrymple as "Notes," consists of a running narrative of the journey and of the various places and things which were investigated. The notes are by no means of a technical nature, and are intended merely as a preliminary to a report which is to follow on the special subject of bridges across rivers in cities. It was in view of the proposals now afoot for the construction of additional bridges across the Clyde in Glasgow for the accommodation of tramway and other traffic that the two gentlemen conducted their special inquiry in regard to bridges in American cities. They also, however, investigated the conditions of working of tramway or street railway systems, and devoted a good deal of attention to various branches of municipal administration.

In reference to municipal government, Mr. Dalrymple refers to the uncomplimentary way in which the American speaks of his municipal representatives. Yet he could get no definite information as to any evil practice on the part of city representatives. In a large number of cities a new form of city government known as the Commission form is being widely adopted. The citizens, instead of electing their representatives in the usual way, elect five, seven, or nine of their number to run the city for a given number of years. These Commissioners receive a salary and devote the whole of their time to city work. Mr. Dalrymple doubts very much whether this is the last word in city government.

The report makes reference to the tramway systems, bridges, and other public features of the various towns which the deputation visited, from New York on the east to San Francisco on the west. Reference is made to the high wages of tramway men, and to a great drawback to the successful operation of the tramways,

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namely, the change which is constantly going on in the personnel of the staff. The arrangements as to fares must lead to a great deal of abuse on the part of both conductors and passengers. The idea of municipalisation of street railways is gaining ground in the United States. As a general rule the street railway companies have not spent much on their workshops and car sheds, but things are improving. The newer style of car shed, seen at Minneapolis, seemed only to be used when the cars were being cleaned or inspected. At other times the cars were allowed to lie out in the open.

At Vancouver the deputation found among other things that about 70 of the men employed on the tramways were former Glasgow tramway employees. Some of them own their own homes and have been speculating in real estate. The deputation noticed in Philadelphia, perhaps more than in any other city, the effect of the stringent regulations for the conduct of street traffic. Any person who wishes to board or leave a car can do so in perfect safety, as no driver of a horse or motor vehicle would attempt to pass between a car and the kerb at a car stopping place. By comparison the education of those in charge of vehicles in Glasgow is very deficient. Touching on the annual convention of the American Electric Railway Association in Atlantic City in October, special mention is made of the magnitude of the exhibition of tramway appliances, which as usual was a feature of the convention. Some interesting figures are given regarding New York's rapid transit facilities, and among other things it is noted that on the 1,500 miles of tramway, elevated, and subway lines in Greater New York the number of passengers is about 1,700 millions a year, or 338 journeys per head of the population. This is practically the Glasgow average, and none of the other American cities reach this figure. When the deputation were informed that in New York, Chicago, Philadelphia, and Boston the capital expended on the transit systems amounted to about £100,000,000, and that arrangements have been made for the expenditure of another £100,000,000, they thought it was time to say "Good-bye"!

The conclusion of the report urges the necessity for constructing two new bridges across the Clyde in Glasgow, one at Oswald Street and the other at Dixon Street. Mr. Dalrymple is also satisfied that the present type of car and the present system of graded fares are the best for Glasgow.

L.C.C. TRAMWAY MATTERS.

OBSOLETE CAPITAL EXPENDITURE ON HORSE TRACTION.

At last Tuesday's meeting of the London County Council the Finance Committee called attention to a resolution of the Council of June, 1908, to the effect that provision should be made for the repayment within 15 years from March 31, 1914, of the outstanding debt estimated at £961,954 in respect of obsolete capital expenditure on horse tramways. This proposal was of a more drastic character than those usually applied to commercial undertakings, and it would place the tramways in a strong financial position. In a report of the same date, however, the Finance Committee had expressed the opinion that the renewals fund should be a first charge upon the tramway surplus revenue, while the acceleration of the repayment of obsolete capital should rank after the renewals fund, and should be regarded as a proper use to which to apply any surplus balance remaining after providing for renewals. The accounts for the year 1912-13 showed a balance of only £497 available for the renewals fund. The Committee attached great importance to the maintenance of the principle of writing off the obsolete capital expenditure within a period considerably shorter than the original period of 60 years, but in view of the heavy additional charges which would fall upon the tramway undertaking in each of the next 15 years if the acceleration of repayment were adopted, and of the fact that at present the full provision could not be made for renewals, the Committee were of opinion that the renewals resolution of June, 1908, should be rescinded, and that the matter should be reconsidered at a future date when there was any surplus available for the purpose after the renewals fund had been made up to the full amount, but in any case not later than March 31, 1917.

After some discussion and a division this report was adopted.

PAY OF PERMANENT WAY ENGINEER EMPLOYEES.

The Highways Committee reported that a request had been received from the fitters, turners, planers, shapers, slotters, blacksmiths, drillers, and hammermen employed in the permanent way section of the tramway department that their wages should be increased to the same extent as an increase agreed upon by the rolling stock conciliation board, and approved by the Council in November last, as regarded similar grades employed in the rolling stock section. The increase granted to the employees in the rolling stock section was ½d. an hour and a further increase of ½d. an hour a year later. The Committee proposed, and it was agreed, that the present application should be referred to the permanent way and building conciliation board.

RETURN TICKETS.

Replying to questions,

Mr. G. H. Hume, acting chairman of the Highways Committee, said that the question of issuing return tickets for penny stages had been before the Committee, but decision had been postponed in order to ascertain the precise effect of the return tickets for longer stages; the long distance passengers might, he admitted, have an advantage over the short distance passengers in this respect. The Committee were aware of the difficulty in the rush hours for the intermediate passengers, and were doing their best to meet it by turning cars back as far as practicable.

THE MUNICIPAL TRAMWAYS ASSOCIATION.

The annual report of the Municipal Tramways Association (Incorporated) containing a verbatim report of the proceedings at the annual conference held at Sheffield in September last, together with copies of the various papers read and discussed at that conference, has now been published by the Hon. Secretary, Mr. C. J. Spencer, and copies can be obtained from him at his offices, 5 and 7, Hall Ings, Bradford, at the price of 5s. per copy. There are many papers in this volume of considerable interest to tramway operators, who will find the report extremely useful for reference. Corporations desirous of obtaining a number of copies are requested to make early application for the same to the Honorary Secretary.

MISCELLANEOUS NEWS AND NOTES.

Russian Tramway Loan.—Perm Municipality (Russia) are borrowing £50,800 for electricity supply purposes, and £116,400 for electric tramways.

Motor Omnibuses for South Shields.—The Tramways Committee has recommended the acquisition of motor omnibuses, to be used for services between the town and outlying districts.

New Workshops for Wallasey.—The Tramways Committee have recommended the Council to apply for sanction to borrow £10,000 for the erection of workshops and the provision of machinery.

Rochdale Town Council is considering the construction of depôt extension for the tramways department. It is stated that a number of cars have now to remain in the open during the night.

Burnley Tramways Committee have recommended the Town Council to proceed with plans for tramways in Stoneyholme. The estimated cost amounts to £26,730 for overhead equipment and track; the cars are scheduled at £10,800 and depôt extensions at £1,000.

Manchester Commercial Motor Show.—There is a notable collection of commercial and industrial vehicles at the exhibition which is being held in the City Hall, Manchester, to-day (Saturday) and until February 7. The show is the best yet held at Manchester.

Telephone Wires on Railless Traction Routes.—In order to save the erection of guard wires the Brighton Tramways Committee have asked the town clerk and the tramways engineer to interview the Post Office authorities on the subject of removing the telephone wires on the main railless traction routes.

Renewals at Dover.—According to the report of the borough surveyor, renewals and repairs are required at an estimated cost of £3,477. Mr. E. Carden, general manager of the tramways, has suggested that the reserve fund should be increased from 1 to 4 per cent. of the annual revenue, to provide for the early renewal of cars and general equipment.

Ticket Boxes on Croydon Cars.—The tramcars of the Croydon Corporation have been fitted with boxes for the receipt of used tickets. The receptacles are placed on the outsides of the cars above the platforms, and are similar to the box made by the Equipment and Engineering Company, which was illustrated in our issue dated December 11 last.

Tramway from Jerusalem to Bethlehem.—It was reported from Jerusalem on January 27 that under the new Vilayets Law a forty years' concession has been granted locally to the French banking firm of Perrier for the construction of a tramway line from Jerusalem to Bethlehem, the lighting of the city with electricity, and a water supply from Wady Forah.

Birmingham Car Partly Overturned.—Owing, it is said, to a stone having become wedged in the groove of one of the rails a tramcar left the metals on January 25 at the point at which a line branches off to the Selly Oak shelter. It ran down the slope into the gutter, turning over and resting against a hoarding erected in front of a wall. Neither the car crew nor the four passengers were injured.

Successful Bonus Scheme at Belfast.—On the report of Mr. Nance, the general manager, the Tramways Committee have ordered payment of the annual bonuses. These rewards were gained by 119 motormen for careful driving, freedom from avoidable accidents, and good conduct, and of these 28 deserved special commendation. The numbers for the previous year were 127 and 22 respectively. Of the conductors 125 were entitled to the annual bonus for accuracy in their cash and daily accounts and general good conduct, and of these 42 gained special commendation for exceptional and, in six cases, astonishing accuracy.

Middlesbrough Motor Transport Company.—This new company has been granted two licences by the Northumberland County Council. It is intended to place a dozen Daimler omnibuses on various routes, to provide a passenger, goods, and fish service between Middlesbrough and the Hartlepools, and also to cater by motor cars and chars-a-banc for the pleasure seekers of Cleveland and south-east Durham.—The Middlesbrough, Stockton, and Thornaby Tramways Company have since announced that they have under construction a number of motor omnibuses, and have made all arrangements for starting a service in the spring.

Tramcar and Omnibus Stopping Places.—It is announced that application has been made to the Board of Trade on behalf of London County Council to sanction a by-law prohibiting omnibuses from stopping at the points fixed as stopping places for the tramcars. For the sake of the safety of passengers and also to reduce traffic congestion the Metropolitan Police view is that the two classes of vehicles should not have the same stopping places, but that the omnibuses should stop some distance behind the tramway stopping points. Proposals for a conference between County Council representatives and other parties concerned in the matter have not led to any result.

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CONTRACTS AND ORDERS.

Babcock and Wilcox, Limited, are supplying coal conveying plant to the Rawtenstall Corporation.

The United Electric Car Company's tender for six car bodies and trucks has been accepted by Preston Town Council.

The British Westinghouse Electric and Manufacturing Company will supply three 1,000 kw. rotary converters to the Port of London Authority.

Messrs. Cory and Sons, Limited, have a contract from Croydon Corporation for the supply of 5,000 tons of Murfield washed pea nuts, at 16s. 5d. per ton.

Siemens Brothers Dynamo Works have an order from Norwich Town Council for a high tension switchboard, for the new alternator and rotaries.

The British Westinghouse Electric and Manufacturing Company have an order from Huddersfield Electricity Committee for condensing plant.

Messrs. Dick, Kerr and Company's tender to Dover Town Council for 50 tons of rails and the requisite supply of fishplaces has been accepted. The same firm has the order for the electrical equipment required for six new cars for Preston Corporation.

Leicester Town Council have accepted the following tenders:—Dick, Kerr and Company, electrical equipment and trucks, £3,846; Brush Electrical Engineering Company, ten canopy top tramcar bodies, £3,842; Messrs. Siemens Brothers Dynamo Works, turbo-alternator, £11,352.

Bradford Town Council have confirmed the recommendation of the Electricity Committee to accept the tender of the Adnil Electric Company (representing the Bergmann Electrical Works, of Berlin) for the supply of a 5,000 kw. turbo-alternator. The cost of the work is about £10,000, and it is estimated that on the usual basis quite three-quarters of this amount will be paid for foreign labour.

Orders for Omnibuses.—Edinburgh Corporation have this week placed an order with Leyland Motors, Limited, Leyland, Lancashire, for three motor omnibuses, and with W. A. Stevens, Limited, 26, Victoria Street, London, for three Tilling-Stevens petrol-electric omnibuses. The Mid-Cheshire Omnibus Company, Northwich, have ordered two more chars-a-banc from Leyland Motors, Limited, making five vehicles now on order, three of the number being single-deck omnibuses.

PERSONAL.

Mr. J. W. Turner has been appointed deputy electrical engineer to the Huddersfield Corporation. The salary is £230 per annum, rising to £260.

Mr. D. L. Winter, of Bo'ness, has been appointed resident engineer of the Musselburgh and District Electric Light and Traction Company.

Mr. Robert Watson, recently secretary of the Musselburgh and District Electric Light and Traction Company, Limited, in London, has been appointed manager, in succession to Mr. C. W. Bentley, who has resigned.

Mr. William F. Hamilton, K.C., and **Mr. G. A. Touche,** M.P., have been elected directors of the Anglo-Argentine Tramways Company, to fill vacancies caused by the deaths of Mr. T. Frame Thomson and Mr. E. A. Lazarus-Barlow.

Mr. Bernard M. Jenkin, owing to continued ill-health, has retired from his partnership in the firm of Messrs. Kennedy and Jenkin. The partnership will be continued by the remaining partners, Sir Alex. B. W. Kennedy, Mr. J. M. Kennedy and Mr. S. B. Donkin, under the name of Kennedy and Donkin.

Mr. W. Murphy, chairman of Dublin United Tramways Company, presided at the annual meeting of Dublin Chamber of Commerce on January 27. He remarked that resistance to and the defeat of Syndicalism in Dublin had been followed by similar results in Leeds, in Auckland (New Zealand), and in South Africa, where they had drastic methods of dealing with men of the Larkin type. The victory they had won should not absolve employers from the obligation of seeing that their workpeople received a wage which would enable them to live at least in frugal comfort.

FINANCIAL REPORTS AND MEETINGS.

The Bank Rate was on Thursday dropped from 4 to 3 per cent., a drop which has not taken place before since 1893. On January 22 the rate was dropped from 4½ to 4 per cent.

Liverpool Overhead Railway.—This company have declared a final dividend at the rate of 3½ per cent. on the ordinary shares, making 3 per cent. for the past year. The ordinary shares received 2¼ per cent. for 1912, 1½ per cent. for 1911, and ¾ per cent. for 1910, but the dividend on the 5 per cent. preference shares only was paid for 1909.

Traction and Power Securities.—For 1913 net revenue was £30,275 and £11,255 was brought forward. £7,336 is written off as loss on realisation of investments, and £10,000 placed to investment reserve, and the board recommend dividend at rate of 4s. 6d. per share, free of tax (£10,217), and carry forward £4,076. During the year there has been returned to shareholders paid up capital to amount of £2 per share, and issued capital now is £683,280.

Liverpool Tramway Profits.—The Tramways and Electric Power and Lighting Committee have decided to recommend the Council to place the sum of £125,000 towards the reduction of the rates, namely, £100,000 from the tramways and £25,000 from the electric light department. Last year the rates received from the tramways £66,000, and from the electric light supply £30,000. The additional relief received this year will amount to nearly 1½d. in the £.

The British Electrical Federation.—The traffic statement for the week ended January 23, 1914, shows that the receipts from tramways and railways amounted to £36,284, as compared with £35,818 in the corresponding week last year, and from omnibuses £10,991, as compared with £1,130, making a total of £47,275, as compared with £36,948. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year the receipts show an increase of £310 upon the week.

Chatham and District Light Railways.—The report of this company shows that for the half-year to December 31 the revenue was £25,879 and expenses £14,115; including rent of Rochester Corporation lines £1,872, interest on debentures £934, interest account £345, leaving £8,613. The balance brought forward was £2,766, making £11,379. Of this sum £5,500 is transferred to reserve for depreciation, and the directors recommend a dividend at the rate of 5 per cent. per annum for the half-year on preference shares, and at the rate of 4 per cent. per annum for the half-year on ordinary shares, carrying forward £819.

Dublin United Tramways.—The directors' report for the year ended December 31, 1913, mentions that a strike of the motormen and conductors was attempted on August 26 last, the first day of the Dublin Horse Show, but it was frustrated by the loyalty of the large majority of the company's staff. The restricted service of cars which for a time became necessary, and the general disorganisation of the business of the city, owing to strikes, during the last four months of the year, had a serious effect on the receipts. In the circumstances, a reduction in the rate of dividend from six to five per cent. is recommended, after setting aside £7,000 towards renewal of permanent way, and £3,000 towards renewal of cars. The accounts show that the amount available for division is £88,040. *Ad interim* dividends, amounting to £35,595, were paid on August 1, leaving £52,445 now available. The dividends and sums set aside will absorb £42,487, leaving £9,958 to be carried forward. The total receipts amounted to £297,731, and the expenses to £177,859, the balance to net revenue being £119,872. The number of passengers carried was 53,907,845. The company now own 54 miles 15 chains of line, and the total mileage of passenger and other cars was 7,175,852. The energy consumption amounted to 11,671,048 units.

WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended January 24 amounted to £209,898, or £18 more than in the corresponding week last year, while the track mileage was 2,862, or 80 more than for the corresponding week. The receipts were at the rate of £73 6s. 9d. per track mile, a decrease of £2 2s. 7d. per mile as compared with last year.

(Continued from page 82.)

CORPORATION OF GLOUCESTER.

TENDERS FOR STORES.

The Electricity and Light Railways Committee invite tenders for 12 months' supply of the following Stores, commencing April 1, 1914:—

Car Wheel Tyres.	Mutton Cloths.
Light Car Oil.	Brushes.
Yellow Grease.	Iron and Brass Screws.
Paraffin.	Raw Linseed Oil.
Emery Cloth.	Turpentine.
Glass Paper.	Gold Size.
Liquid Metal Polish.	Benzoline.
Chamois Leather.	White Lead.

Conditions and form of tender may be obtained from the undersigned.

F. H. CORSON,
General Manager and Engineer.

Light Railway Offices,
Bristol Road, Gloucester.

LIVERPOOL CORPORATION TRAMWAYS.

The Tramways and Electric Power and Lighting Committee of the Liverpool Corporation are prepared to receive tenders for the supply and delivery of about 100 Standard Traction 40 h.p. Double Motor Equipments.

Official forms of tender may be obtained on application to Mr. C. W. Mallins, General Manager, Corporation Tramways, 24, Hatton Garden, Liverpool.

Tenders to be endorsed "Tender for Motor Equipments," and accompanied by full detailed specifications and drawings, to be addressed to the undersigned, and received by him not later than the first postal delivery on Thursday, February 12, 1914.

The Corporation do not bind themselves to accept the lowest or any tender.

(Sgd.) EDWARD R. PICKMERE,
Town Clerk.

Municipal Buildings, Dale Street, Liverpool,
January 19, 1914.

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PORTSMOUTH CORPORATION.

TRAMWAYS COMMITTEE.

The Tramways Committee of the above Corporation invite tenders for the supply of the under-mentioned goods, from April 1, 1914, to March 31, 1915 :—

Section A.—Ballast, Sand, and Grit.
" B.—Portland Cement (British manufacture preferred).
" C.—Brooms and Brushes.
" D.—Oils (not lubricating), Chemicals, Sheet Glass, etc.
" E.—Smiths' Coal and Coke.
" F.—Timber.
" G.—Fodder.
" H.—Brake Blocks.
" I.—Engine Packings, Asbestos Goods, etc.
" J.—General Ironmongery (not including Tools).
" K.—Welsh Steam Coal.
" M.—Steel Tramway Tyres (200).
" O.—Wood Paving Blocks.
" P.—Car Repair Stores.
" Q.—Insulating Materials, Lamps, and Motor Windings.
" R.—Overhead Line Materials.
" S.—Lubricating Oils, Greases, etc.
" T.—Chandlery, etc.
" U.—Castings and Machined Parts.
" V.—Car Paints, etc.
" Va.—Car Varnishes.
" W.—Trolley Wire (9,180 yards).
" X.—Feeder Cable (780 yards, 5 sq. in.).

The specification and form of tender may be obtained upon application to the Engineer, Mr. V. G. Lironi, M.I.M.E., A.M.I.E.E., Engineer's Offices, Fratton Grove, Portsmouth.

Tenders, marked "Tender for ————," to be delivered to the Town Clerk, Town Hall, Portsmouth, not later than 10 a.m. on Tuesday, February 17, 1914.

The form of tender must include a declaration that the person making the tender pays the rates of wages and observes the hours of labour and conditions contained in the Corporation Fair Wages Clause.

The Committee do not bind themselves to accept the lowest or any tender.

W. R. SPAVEN,
General Manager.

Town Hall, Portsmouth,
January 27, 1914.

COUNTY BOROUGH OF NEWPORT.

ELECTRICITY AND TRAMWAYS DEPARTMENT.

SUPPLY OF GENERAL STORES.

The Electricity and Tramways Committee invite tenders for the supply of Stores as set forth in the following schedules, during the year ending March 31, 1915.

A—Electrical Supplies, Cables, Conduit, Lamps, Carbons, etc.
B—Car Fittings, Iron, Steel, and Gunmetal Castings, Springs, etc.
C—Paints, Varnishes, Transfers, Brushes, etc
D—Glass.
E—Overhead Line Fittings.
F—General Stores (Brushes, Chamois, Polish).
G—Power Station Stores, and Rubber Goods.
H—Iron, Steel, Bolts, Screws, and Ironmongery.
I—Tools (Files, Drills, Spanners, Picks, etc.).
J—Oils, Greases, etc.
K—Building Materials (Bricks, Fire Clay, Timber, etc.).
L—Permanent Way Material (Pitch, Cement, Gravel, Coal, etc.).

Conditions of contract, schedules, and form of tender may be obtained on application at the office of the General Manager, Electricity and Tramways Department, Town Hall, Newport, Mon. Further information may be obtained from and drawings and samples seen upon application to the Borough Electrical Engineer, Town Hall, Newport, Mon.

Tenders must be enclosed in a sealed cover addressed to the undersigned, and endorsed in the left-hand corner "Tender for Stores," and delivered at the Town Hall not later than first post, Monday, February 16, 1914.

ALBERT A. NEWMAN,
Town Clerk.

Town Hall, Newport, Mon.,
January, 1914.

BURY CORPORATION.

The Corporation of Bury invite tenders for the supply of Uniform Clothing.

Specification and forms of tender may be obtained, and samples inspected on application to the General Manager, Central Tramway Offices, Market Place.

Tenders to be delivered to the Town Clerk, Bury, not later than February 11, 1914.

MANCHESTER CORPORATION TRAMWAYS.

The Tramways Committee of the Manchester Corporation are prepared to receive tenders for the supply of the following :—

(*a*) Macintoshes, Oil Capes, and Sou'westers,
(*b*) Veterinary Services.
(*c*) Oxygen and Acetylene Gas,
(*d*) Tramcar type ampere-hour Meters,

and General Stores, as set forth in the undermentioned schedules, during the twelve months ending March 31, 1915, viz. :—

SCHEDULE A.
Motor and Controller Parts, etc.
Motor Cases.
Resistances (Grid type).
Commutator Segments (Assembled).
Armature and Field Coils.
Trolley Poles.
Lightning Arresters (Traction).
Lamps, Car. Switches, Bells, Cells, Tubing, etc.
Telephones and Testing Instruments.
Insulation Material.
Carbon Brushes.
Arc Lamp Carbons.
Overhead Equipment Material.
Trolley Bases.
Trolley Heads, Trolley Wheel Bushes and Spindles.
Electrical Signal Spare Parts.
Sanding Devices.
"Peacock" Brakes.
Lifeguards.

SCHEDULE B.
Cable (Power and Lighting), Bell Wire.
Copper, Brass, Steel and Iron Wire, Sheet Copper, and Brass.
Galvanised Steel Cable, etc.

SCHEDULE C.
Timber, Veneer, etc., Sawdust.
Handcarts, Barrows, etc.

SCHEDULE D.
Lubricants, Oils, Motor Spirit, etc.
Soaps, Disinfectants, etc.
Metal Polish.
White and Red Lead.
Paints, Varnishes, etc.
Methylated Spirits, Shellac.
Turpentine, Linseed Oil.
Ammonia, Caustic Soda, etc.
Transfers, English Gold Leaf.
Linerusta Walton.
Ambulance Accessories.

SCHEDULE E.
Plate Glass, Ruby Glass, Globes, Lamp Glasses, etc.
Crucibles, Fireclay Material, etc.

SCHEDULE F.
Rubber Strip, Goloshes, Gloves, and Sundry Rubber Goods.
Canvas and Fire Hose.
Rubber Tyres for Motor Vehicles, etc.
Leather Belting, Washers, etc.

SCHEDULE G.
Workshop Tools, etc.
Metal Cutting Saws.
Permanent Way Tools.
Lamps, Buckets, Cans, etc.
Car Brass Furniture, etc.
Sundry Ironmongery.
Grinding Blocks, Emery Wheels, etc.
Enamelled Iron Plates.

SCHEDULE H.
Iron and Steel, etc.
Steel Tie Bars.
Steel Fish Bolts.
Bolts, Screws, etc.
Truck Springs and Sundry Springs.
Chains, etc.
Ornamental Fences.
Steel Stampings.
Iron and Steel Forgings, etc.
Anti-friction White Metal.
Tin Plates, Lead, etc.

SCHEDULE I.
Car Axles.
Car Wheel Tyres
Car Wheel Centres.
Gear and Pinion Wheels.

SCHEDULE J.
Iron and Steel Castings.
Coal and Furnace Coke.

SCHEDULE K.
Paint and Varnish Brushes, Cleaning and Stable Brushes.
Sponges, Dusters, Cotton Waste, etc.
Supply, Cleaning and Renewal of Cleaning Cloths.
Lubricant Pads, etc., for Axle Boxes.
Rope, Cords, etc. (including Trolley Cord).
Lamp Wicks.
Grey Duck, Twill, Scrim, Holland, etc.
Saddlery, etc., and Leather Leggings.
Lurry Sheets, Canvas Bags, etc.
Hampers, etc.

SCHEDULE L.
Portland Cement.
Chippings and Broken Stone.
Sand.
Bricks and Slates.
Sanitary Fittings, etc.

Schedules, etc., may be obtained on application to Mr. J. M. McElroy, General Manager, Corporation Tramways, 55, Piccadilly, Manchester. Tenders are to be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, and must be received not later than 10 a.m. on Tuesday, February 17, 1914.

The Committee do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester,
January 29, 1914.

BOROUGH OF SOUTHEND-ON-SEA.

The Corporation of Southend-on-Sea invite tenders for
Six Oil Engines of the Diesel Type.

For further particulars apply to Mr. Robert Birkett, Electrical Engineer and General Manager, London Road, Southend-on-Sea.

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BECKENHAM URBAN DISTRICT COUNCIL.

TO MOTOR FIRE ENGINE MAKERS.

The Beckenham Urban District Council invite tenders for the supply and delivery to Beckenham of a Petrol-Driven Motor Fire Engine, Escape, and Ladders.

Particulars and forms of tender obtained on application to Mr. John A. Angell, Surveyor, on and after January 31, on the production of a receipt from the Collector for a deposit of £1, which will be returned on the receipt of a *bonâ-fide* tender.

A clause will be inserted in the contract, providing that the contractor shall pay to the employees the wages generally accepted as current for workmen engaged on similar work in the town where the work is executed.

Tenders, duly sealed and endorsed "Tender for Fire Engine," to reach the undersigned not later than 4 p.m. Monday, February 9th.

The Council do not bind themselves to accept the lowest or any tender.

By order, F. STEVENS,
Clerk of the Council.

January 30, 1914.

COUNTY BOROUGH OF CROYDON.

CROYDON CORPORATION TRAMWAYS.

ADVERTISING UPON TRAMCARS.

Notice is hereby given that the Council are prepared to receive tenders for Advertising upon the Tramcars of the Corporation, 75 in number, for a period of seven years from March 25, 1914.

Form of tender and general conditions with drawings showing the position to be let for the purpose, may be obtained on application at my office.

Tenders to be sent to me by 11 o'clock in the forenoon of Friday, the 20th day of February, 1914, endorsed "Tender for Advertising upon Tramcars."

Tenders will only be received subject to the draft contract and general conditions which have been deposited at my office, and may be inspected during office hours.

The Council will not be bound to accept the highest or any tender.

JOHN M. NEWNHAM,
Town Clerk.

Town Hall, Croydon,
January 27, 1914.

COUNTY BOROUGH OF WEST HAM.

TRAMWAY UNIFORM CLOTHING, CAPS, WATERPROOFS, ETC.

The Council hereby invite tenders for the supply of Uniform Clothing, Caps, etc., for Tramway Inspectors, Motormen, Conductors, etc.

Standard samples may be seen, and form of specification and tender obtained at the office of Mr. J. S. D. Moffet, Tramways Manager, Greengate Street, Plaistow, E., upon payment of £1, which will be returned on receipt of a *bonâ-fide* tender.

NOTE.—No tender will be considered unless the same is delivered at the Office of the Town Clerk, Town Hall, West Ham, E., in the envelope supplied, by registered post, not later than 12 o'clock noon on February 6, 1914.

The Council do not bind themselves to accept the lowest or any tender.

The contractor will be required to enter into a bond with one surety for the due performance of the contract, and no work will be ordered under the contract until such bond has been duly executed.

The contractor whose tender is accepted, and with whom the contract is entered into, will be required to pay direct to all workpeople employed in connection with this contract the rate of wages and observe the hours of labour specified in the schedule attached to the form of tender. In the event of any breach of such agreement the Council will enforce the penalty clause in its entirety.

H. W. GREAVES.
Town Clerk.

Town Hall, West Ham, E.,
January 23, 1914.

DICK, KERR & CO.,
Limited,
ABCHURCH YARD, CANNON STREET, LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

POSITIONS VACANT.

COUNTY BOROUGH OF STOKE-ON-TRENT.

ELECTRICAL ENGINEER'S DEPARTMENT.

Applications are invited for the position of Engineering and Mechanical Draughtsman. Applicants should have experience in the preparing and checking of plans of Electricity Works extensions, in the lay out of steam pipes, etc., and mains plans. Salary, £104 per annum, rising on approved service £13 per annum to £130 per annum. Form of application and particulars of duties may be obtained from the Borough Electrical Engineer, St. Peter's Chambers, Stoke-on-Trent.

E. B. SHARPLEY,
Town Clerk.

Town Hall, Stoke-on-Trent.

COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

SHIFT ENGINEER.

The Electricity and Tramways Committee of the Corporation of Warrington invite applications for the post of Shift Engineer.

Applications will only be considered from persons who have had practical experience in the generation and distribution of energy, upon both H.T. and the L.T. systems, water-tube boilers, high-speed engines and turbines, and have had a good mechanical and theoretical training. Salary £2 7s. 6d. per week.

Forms of application and list of duties can be obtained from the undersigned.

Applications to reach me not later than first post Monday, February 9, 1914.

F. V. L. MATHIAS,
Borough Electrical and Tramways Engineer.

Electricity Works. Howley, Warrington.

COPPER AND ALUMINIUM MARKET.

January 30, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

	Friday, January 30.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	65 17 6 ..	65 12 6 ..	69 0 0
,, ,, (three months)	66 5 0 ..	65 17 6 ..	69 5 0
Electrolytic Copper—bars or ingots ..	67 15 0 ..	67 10 0 ..	75 0 0
Aluminium—bars or ingots	83 0 0 ..	83 0 0 ..	93 10 0

COAL MARKET.

January 30, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

	Friday, January 30.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	s. d.
Best Admiralty Welsh (large)	23 6 ..	23 6 ..	24 6 ..	24 3
Best Seconds..	23 0 ..	23 0 ..	24 0 ..	23 6
Ordinary Drys	21 6 ..	21 6 ..	23 0 ..	22 3
Best Washed Nuts	21 0 ..	21 0 ..	21 6 ..	21 6
Best Washed Peas	19 6 ..	19 6 ..	20 0 ..	19 0½
Cardiff, f.o.b.—				b/
Best Admiralty (large) ..	19 0 ..	19 0 ..	19 6 ..	19 3
Best Seconds	18 6 ..	18 6 ..	19 0 ..	18 6
Ordinary Drys	17 0 ..	17 0 ..	18 0 ..	17 3
Best Washed Nuts	16 6 ..	16 6 ..	16 6 ..	16 6
Best Washed Peas	15 0 ..	15 0 ..	15 0 ..	14 0
Newcastle, f.o.b.—				
Best Steams..	14 6 ..	14 6 ..	15 6 ..	13 9
Best Seconds	12 3 ..	12 6 ..	14 6 ..	13 0
Smalls	7 0 ..	6 9 ..	11 0 ..	9 3

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregate. Wks.	Aggregate. 1913-4.	Increase or Dec.
Anglo-Argentine	Jan. 21	£53,253	£56,621	3	£172,888	+ £6,892
Auckland..... (28 days)	Jan. 16	21,653	25,633	29	135,538	— 3,674
Ballarat and Bendigo	Nov.	4,798	3,737	34	30,725	— 711
Brazilian St. Rly. Mlrs.	Dec.	47,512	57,250	22	264,464	+ 45,611
Brazilian Traction.....	Jan. 24	84,639	94,026	4	378,914	+ 38,145
Brisbane	Dec.	25,890	29,145	52	3 6 216	+ 61,906
British Columbia ..... $	Dec.	778,741	793,219	26	4,553,728	+ 302,902
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacrose..	Dec.	47,188	47,624	26	272,894	+ 9,337
Calcutta.....Rs.	Jan. 24	64,288	68,040	4	2,80,898	+ 6,752
Cape Town	Dec.	...	14,925	...	...	...
Carthagena & Herreria.	Dec.	8,001	2,698	52	20 863	+ 4,517
Cordoba	Dec.	12,266	12,863	39	120,313	+ 11,061
East India	Dec.	1,842	2,046	22	9,879	+ 349
Kalgoorlie.....	Dec.	3,206	2,907	52	34,510	— 8,300
La Plata.....	Dec.	5,862	5,680	52	61,520	+ 9,344
Lima.....	Sept.	22,660	34,110	39	300,647	+ 23,783
Lisbon ..... Mlrs.	Sept.	...	144,538	...	...	...
Madras (14 days) Rs.	Jan. 15	26,000	29,303	2	29,303	+ 2,713
Melbourne	Dec.	...	69,000	...	...	...
Mexico ..... $	Dec.	633,102	611,673	52	6,813,046	+ 136,482
Montevideo.....	Dec.	34 468	33,309	9	63,889	— 267
Para	Jan. 25	3,991	3,219	8	26.801	— 5,305
Port Elizabeth	Dec.	...	4,967	...	...	...
Shanghai ..... $	Jan. 21	18,860	23,800	3	70,400	+ 13,110
Singapore ..... $	Jan. 24	10,996	10,994	4	45,308	+ 1,786
Toronto ..... $	Nov.	742,156	849,279	48	8,893,984	+1,176,680
Winnipeg..... $	Dec.	361,700	379,863	52	4,078,694	+ 313,310

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1912-3.	1913-4.	Incr. or Dec.	Aggregate. Wks.	1913-4.	Increase or Dec.
Aberdeen Corporation..	Jan. 21	£1,411	£1,371	— £40	34	£55,383	+ £3,151
Accrington Corp.....	,, 21	506	513	+ 7	42	24,334	+ 2,177
Ayr Corporation	,, 24	189	210	+ 21	36	14,133	+ 1,994
Bath Electric	,, 21	663	640	— 23	3	2,028	— 209
Birkenhead Corp.	,, 25	1,117	1,136	— 19	43	55,494	+ 5,046
Birmingham Corp.	,, 24	11,962	11,765	+ 403	43	510,152	+ 42,832
Blackburn Corporation	,, 21	1,119	1,006	— 113	43	56,408	+ 4,942
Blackpool Corporation	,, 22	446	429	— 17	42	78,440	+ 12,236
Bolton Corporation	,, 25	2,516	2,486	— 30	43	117,985	+ 6,408
Bournemouth Corp.....	,, 28	1,492	1,431	— 61	43	89,952	+ 9,294
Bradford Corporation..	,, 24	5,397	5,286	— 111	42	253,879	+ 14,879
Brighton Corporation..	,, 25	769	658	— 111	43	47,116	+ 2,826
Bristol	,, 23	6,715	6,773	+ 58	3½	24,153	+ 327
British Elec. Federatn.	,, 23	36,948	47,275	*	...	...	...
Burnley Corporation ..	,, 24	1,572	1,481	— 91	43	73,214	+ 7,797
Burton-on-Trent Corp.	,, 25	248	260	+ 12	43	12,721	+ 613
Bury Corporation.....	,, 25	1,224	1,155	— 69	43	58,008	+ 2,141
Cardiff Corporation.....	Dec. 27	2,733	2,942	+ 209	39	107,267	+ 11,181
Chatham and District..	Jan. 22	843	746	— 97	3	2,469	— 339
Chesterfield Corp.	,, 22	237	237	Nil	42	11,020	+ 1,233
Colne & Trawden.....	,, 24	238	227	— 11	4	901	+ 28
Cork Electric.....	,, 22	413	400	— 13	3	1,348	— 94
Croydon Corporation ...	,, 16	1,506	1,459	— 47	41	68,955	— 6,280
Darlington Corporation	,, 24	221	226	+ 5	43	10,733	+ 980
Derby Corporation	,, 24	875	850	— 25	43	42,213	+ 3,815
Dover Corporation	,, 24	193	163	— 30	43	10,585	+ 88
Dublin & Lucan	,, 23	106	101	— 5	3	361	— 17
Dublin United	,, 23	5,352	4,808	— 544	4	16,512	— 1,600
Dundee City	,, 21	1,167	1,194	+ 27	36	47,435	+ 3,317
East Ham Corporation	,, 24	1,115	1,002	— 113	43	44,398	— 2,102
Exeter Corporation	,, 23	276	245	— 31	43	14,700	+ 606
Gearless Motor 'Buses.	,, 24	...	399	...	4	1,554	...
Glasgow Corporation ...	,, 24	18,802	19,377	+ 575	34	692,959	+ 48,922
Glossop(U.Elec.Supply)	,, 24	125	120	— 5	4	463	— 16
Halifax Corporation ...	,, 20	1,749	1,838	+ 89	42	89,371	+ 3,221
Hastings & District.....	,, 21	715	608	— 107	3	1,967	— 227
Huddersfield Corp.	,, 24	2,017	2,033	+ 16	42	91,498	+ 4,624
Hull Corporation	,, 24	3,089	3,133	+ 44	43	136,037	+ 6,996
Ilford U.D.C.	,, 24	411	380	— 31	42	19,345	— 995
Ilkeston Corporation ..	,, 28	114	117	+ 3	44	5,806	+ 339
Ipswich Corporation ...	,, 24	358	324	— 34	43	19,718	+ 673
Isle of Thanet	,, 24	263	237	— 26	17	5,842	+ 450
Kilmarnock Corp.	,, 24	151	151	Nil	36	6,417	+ 415
Lanarkshire	,, 22	1,477	1,667	+ 190	3	5,956	+ 444
Lancashire United	,, 21	1,267	1,438	+ 171	3	4,540	+ 615
Leeds City	,, 24	7,541	7,572	+ 31	42	347,800	+ 19,841
Leicester Corporation..	,, 24	2,674	2,614	— 60	4	9,388	+ 465
Leith Corporation	,, 24	609	628	+ 19	36	25,830	+ 1,177
Leyton U.D.C.	,, 8	1,234	1,270	+ 36	40½	54,697	— 326
Liverpool Corporation..	,, 24	12,144	12,168	+ 24	3	43,556	+ 1,445
Llandudno & Colwyn B.	,, 23	133	136	+ 3	8	1,168	— 7
London County Council	,, 21	40,901	40,633	— 268	41	1,787,630	+ 5,644
London Gnl. Omnibus..	,, 24	52,657	49,779	— 2,878	4	209,571	— 9,163
London United	,, 28	5,167	5,069	— 98	4	17,231	— 415
Lowestoft Corporation	,, 24	168	157	— 11	16	3,107	+ 224
Maidstone Corporation	,, 22	162	159	— 3	43	8,783	+ 586
Manchester Corp.....	,, 24	16,686	16,348	— 338	43	753,826	+ 32,885
Met. Elec. Trys.	,, 23	8,213	8,035	— 178	4	26,969	— 743
Nelson Corporation.....	,, 24	183	201	+ 18	43	9,011	+ 521
N'castle-on-Tyne Corp.	,, 24	4,523	4,751	+ 228	43	211,208	+ 19,074
Newport (Mon.) Corp...	,, 24	729	673	— 56	43	33,075	+ 2,346
New St. Helens & Dist..	,, 21	653	672	+ 19	30	24,617	+ 2,317
Northampton Corp	,, 23	519	483	— 36	43	24,703	+ 1,459
Nottingham Corp.	,, 22	3,115	3,122	+ 7	42½	142,578	+ 6,234
Oldham Corporation ..	,, 25	1,998	2,061	+ 63	44	97,117	+ 6,827
Portsmouth Corp.....	,, 17	1,840	1,697	— 143	42	96,136	+ 6,378
Preston Corporation ...	,, 21	777	724	— 53	43	37,385	+ 2,178
Provincial	,, 24	1,571	1,590	+ 19	16	28,760	+ 1,671
Reading Corporation ..	,, 22	650	590	— 60	42	29,768	+ 2,069
Rochdale Corporation	,, 24	1,438	1,425	— 13	43	68,877	+ 2,836
Rotherham Corp.	,, 28	860	989	+ 129	43	43,811	+ 9,235
Salford Corporation ..	,, 26	4,822	4,829	+ 7	43	225,229	+ 10,084
Sheffield Corporation...	,, 25	7,069	7,232	+ 163	43	322,455	+ 23,857
Southampton Corp.....	,, 21	1,179	1,106	— 73	42	56,202	+ 3,111
Southend-on-Sea Corp.	,, 21	549	607	+ 58	43	40,571	+ 6,938
South Met. Trys.	,, 23	684	905	+ 221	4	3,155	+ 784
South Shields Corp.....	,, 24	614	658	+ 44	43	31,004	+ 3,568
Sunderland Corp.....	,, 25	1,274	1,357	+ 83	43	62,289	+ 5,755
Sunderland District ..	,, 21	469	548	+ 79	12	6,775	+ 767
Swindon Corporation ..	,, 21	143	134	— 9	42	7,069	+ 400
Trys. (M.E.T.) 'Buses	,, 24	...	7,484	...	4	27,161	...
TynesideTrys.&Tmrds	,, 21	412	446	+ 34	3	1,328	+ 55
Wallasey Corporation	,, 24	988	1,018	+ 30	43	52,378	+ 4,707
Walsall Corporation ...	,, 24	605	577	— 28	4	2,043	— 75
Walthamstow U.D.C....	,, 24	629	628	— 1	43	32,060	+ 1,191
Warrington Corp.....	,, 1	469	463	— 6	40	17,732	+ 473
West Ham Corporation	,, 22	2,631	2,489	— 142	42	115,922	+ 3,708
Wigan Corporation	,, 22	1,362	1,397	+ 35	42½	63,524	+ 5,932
Wolverhampton Corp	,, 22	986	962	— 24	41	47,225	+ 2,245
Yorkshire (W. Riding)	,, 25	1,316	1,381	+ 65	4	5,409	+ 381

* From such of the services as were working both last year and this year the receipts show an increase of £310 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London.....	Jan. 24	£5,500	£5,358	— £142	4	£21,241	— £1,146
City and South London	,, 24	3,107	2,957	— 150	4	11,840	— 678
Liverpool Overhead.....	,, 25	1,609	1,634	+ 25	4	6,761	+ 217
London Electric.....	,, 24	14,680	14,765	+ 85	4	59,925	+ 20
Mersey	,, 24	2,191	2,195	+ 4	4	8,996	— 13
Metropolitan	,, 25	16,702	18,309	+ 1 607	4	73,170	+ 6,200
Metropolitan District..	,, 24	13,283	13,007	— 276	4	53,049	— 403

The Tramway & Railway World can be obtained, post free, at the following rates:—

For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
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Tel. No.: 2948 Gerrard.
Telegraphic Address: "Tramigro," London.

AMBERLEY HOUSE, NORFOLK ST., W.C.

TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, January 30.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	— 2	70 — 73
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	+ ⅛	4⅞ — 5⅛
5	Do. 5½% Cum. 2nd Pref.	+ ⅛	4⅛ — 4⅜
100	Do. 4% Deb. Stk. Red.	+ ½	89½ — 91½
100	Do. 4½% Deb. Stk. Red.	...	96 — 98
100	Do. 5% Deb. Stk. Red.	— 1½	96 — 98
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	+ 1	103 —106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅜ — ⅝
1	Do. 5% Cum. Pref	...	⅝ — ¾
100	Do. 4½% 1st. Mort. Deb. Stock, Red.	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Sk.	...	84 — 86
10	Blackpool and Fleetwood Tramroad Co.	...	13½ — 14
	Bombay Elec. Supply and Trams. Co., Ord.	...	13½ — 14½
10	Do. do. 6% Cum. Pref	— ⅜	10½ — 11 xd
100	Do. do. 4½% Db. Stk Rd	+ 1½	93½ — 95½
$100	Brazilian Traction Light and Power Co. Lim.	+ 4½	92½ — 94½ xd
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	...	7⅝ — 8⅛
5	Do. do. 5% Cum. Pref	...	4⅞ — 5⅛
100	Do. do. 4½% 1st Deb Stock, Red.	...	97 —100
10	Bristol Tramways and Carriage Co.	...	5½ — 6
10	Do. do. 4% Cum. Pref.	...	6½ — 7
100	Do. do. 4% Deb. Stock	...	100 —102
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	+ 9	119 —123
100	Do. Pref. Ord. Stock	+ 1	106 —110 xd
100	Do. 5% Cum. Perpetual Pref. Stock.	+ ⅛	102½ —105½
100	Do. 4½% 1st Mort. Debs.	...	98 —101
4	Do. 4½% Vancouver Power Debs.	...	94 — 98
100	Do. 4½% Perpetual Cons. Deb. Stk.	+ 2	93 — 96
100	British Elec. Traction Co., Lim., 6% Cum. Pref.	+ 2	90 — 93
100	Do. 7% Non-Cum. Pref.	+ 3	55 — 58
10	Do. 6% Pref. Ord. Non-Cum.	...	12 — 14
100	Do. Deferred Ord. Stock	+ ½	5 — 6½
100	Do. 5% Perpetual Debenture Stock	+ 1	93 — 96
100	Do. 4½% Second Debenture Stock, Rec	+ 2	78 — 81
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	— 3	67 — 72
100	Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb	...	100 —102
5	Calcutta Tramways Co., Limited. Ord.	...	6 — 6½
5	Do do. 5% Cum. Pref.	+ 1/10	5 — 5¼
100	Do. do. 4½% 1st Deb. Stock, Red.	...	96 — 99
1	Cape Electric Tramways, Ld.,	...	⅝ — ¾
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	3 — 3¼
100	Do. 5% Debs., Red.	...	88 — 91
1	City of Buenos Ayres Trams. Co. (1904), Lim.	+ 1/8	5⅞ — 6⅛
100	Do. 4% Debenture Stock Red, 1985	...	91 — 96
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.	...	89 — 93
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	+ ½	95½ — 97½
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	— 8
10	Dublin United Trams. Co. (1896) Lim. Ord.	...	— 11
10	Do. do. 6% Pref.	+ 1/10	— 12⅛
100	Do. do. "A" Red.	...	— 80½
100	Do. do. Deb. Stock "B" Red.	...	— 77
10	Gateshead & Dist Trys. Co., Ord.	...	8¾ — 9¼
10/	Hastings & Dist. Electric Trams. Co., Ld., Ord.	...	½ — ⅝
1	Do. do. 6% Cum. Pref.	...	½ — ¾
100	Do. do 4½% Deb. Stk. Red.	...	66 — 71
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	93½ — 97½
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)	+ ½	86 — 90
10	Imperial Tramways, Ord.	...	3¾ — 4¼
10	Do. do. 6% Cum. Pref.	...	6¼ — 6½
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 6% Cum. Pref.	...	2 — 2½
100	Do. 4% Debenture Stock	...	71 — 76
1	Kalgoorlie Elec. Trams., Ltd.	...	0 — 1/16
100	Do. do. 5% "A" Deb. Stk.	...	85 — 90
100	Do. do. 6% "B" do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.	...	⅞ — 1
10	Lanarkshire Tramways Co.	+ ¼	10 — 10½
100	Lancashire United Tramways, 5% Prior Lien Deb.	+ 2	80 — 82
1	Lisbon Electric Trams., Lim., Ord.	...	1⅛ — 1⅜
1	Do. 6% Cum. Pref.	...	⅝ — 1⅛
100	Do. 5% Mort. Debs.	...	91 — 96
1	London and Suburban Trac. Co., Lim., Ord.	...	¼ — ⅝
100	London General Omnibus Company, Limited, 4½% Deb.	+ 1	96 — 98
100	Do. Do. 5% Cum. Inc. Deb. Stock	+ 3½	92 — 95
100	London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red	— 5	63 — 67
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref.	+ 2	4⅞ — 5¼
5	Do. do. 5% Deb. Stk., Red.	...	101 —103
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	79 — 82
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	+ 3½	114½ —117½
$1,000	Do. do. 5% Bds.	+ 1½	98 —100
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	⅞ — 1
100	Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red.	+ 3	83 — 87
100	Do. do. 5% Deb. Stock, Red.	+ 1	87 — 90
100	Mexico Tramways Co., Common Stock	+ 3	74 — 77
500	Do. Gen. Con. 1st Mort. Gld. Bonds	+ 4½	85 — 90
100	Do. 6% 50-yr. Mort. Bonds	+ 4	85 — 89
...	Michigan United Railways 5% 1st Mort. Gld. Bonds	...	91½ — 93½
100	Montreal Street Railway, Sterling 4½% Debs. (1922)	...	99 —101
100	Do. 4½% Sterling Debs, (1922)	...	98 —100
1	National Steam Car Co. Ltd	+ 1/32	1⅜ — 1⅝ xd
10	Oldham—Ashton and Hyde Elec. Ord.	...	6⅞ — 6½
10	Do. do. 5% Cum. Pref.	...	5⅞ — 6⅛
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	5 — 5⅛
5	Do. do. 6% Cum. Pref.	+ 3/8	4⅛ — 5
1	Perth (W.A.) Elec. Trams., Ld., Ord.	...	1⅛ — 1⅜
1	Potteries Electric Traction Co., Ltd., Ord.	...	⅜ — ½
	Do. 5% Cum Pref.	...	⅝ — ¾
	Do. 4½% Debenture Stock, Red.	...	84 — 87
1	Provincial Tramways, Lim., Ord.	...	⅔ — ⅞
10	Do. 5% 1st Deb. Stock	...	95 — 98
...	Puebla Tramway, Light & Power Co., Prior Lien 5%	+ 5	81 — 85
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.	...	5 — 5½
100	Do. do. 4½% 1st Mt. Db. Stk	...	94½ — 96½
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	87 — 90
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	+ 1	100 —102
100	Do. do. 5% 50-yr. Mort. Gold Bonds	+ 2½	95 — 97
100	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	+ 2	100 —103
$500	Do. 5% 1st Mort. Debs., Red., 1929	...	100 —103
10	Shanghai Elec. Construction Co.	...	10¼ — 11¼
100	Singapore Elec. Tramways Lim., 5% Debs. Red	...	87 — 91
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref.	...	⅝ — ¾
100	Do. do. 4% Deb. Stk.	...	66 — 70
...	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	98 — 100
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	+ 1	98 —100
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	82 — 84
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	92 — 95
5	United Elec. Tramways of Monte Video, Ord.	— ¼	4½ — 5
5	Do. do. 6% Cum. Pref.	...	4⅞ — 5¼
100	Do. do. 5% 1st Deb. Stk. Red.	...	94 — 97
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	95 — 97
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	⅝ — ⅞
5	Do. do. 6% Cum. Pref.	...	3¾ — 4¼
100	Do. do. 4½% 1st Deb. Stock. Red.	...	79 — 84

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

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WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF BOURNEMOUTH.

The Tramways Committee invite tenders for the supply of the following Stores for the year ending March 31, 1915:—

Section 1. Iron Castings.
" 2. Ironmongery.
" 3. Paints.
" 4. General Sundries.

Specification and forms of tender may be obtained upon application to the General Manager on payment of a deposit of 5s. (five shillings) per section, which will be returned on receipt of a *bonâ-fide* tender in that section.

Extra copies of any section may be purchased at 1s. (one shilling) each.

Sealed tenders to be endorsed in accordance with specification, and delivered to the Municipal Buildings, Bournemouth, not later than 12 o'clock noon on Thursday, February 19, 1914, addressed to the Town Clerk.

I. BULFIN, B.A., A.M.I.C.E., M.I.M.E., M.I.E.E.,
General Manager.

Tramways Offices,
Lansdowne Crescent, Bournemouth,
February 5, 1914.

COUNTY BOROUGH OF BOURNEMOUTH.

BOURNEMOUTH CORPORATION TRAMWAYS.

COAL.

The Bournemouth Tramways Committee invite tenders for the supply of Welsh Smokeless Coal (Washed Peas), Household Coal, and Gas Coke, to the Tramways Department for twelve months from April 1, 1914.

Full particulars and form of tender may be obtained of the General Manager (Mr. I. Bulfin) provided the sum of £1 1s. has been previously deposited with the undersigned, which deposit shall become forfeited unless a tender complying with the conditions is sent in.

Extra forms can be obtained at 1s. each.

Tenders to be sent in (endorsed "Tender for Coal and Coke") to the Town Clerk, Municipal Buildings, Bournemouth, before noon on Thursday, February 19, 1914.

The Committee do not bind themselves to accept the lowest or any tender.

I. BULFIN, B.A., A.M.I.C.E., M.I.M.E., M.I.E.E.,
General Manager.

Tramways Offices,
Lansdowne Crescent, Bournemouth,
February 5, 1914.

SALFORD CORPORATION TRAMWAYS.

SUPPLIES.

Tenders invited by February 23, 1914, for two years' supply of Miscellaneous Stores, etc.

For list, send stamped addressed envelope to General Manager, 32, Blackfriars Street, Salford.

LEEDS CITY TRAMWAYS.

The Tramways Committee of the Leeds City Council are prepared to receive tenders for the supply of the following Material during the year ending March 31, 1915:—

(1) Bolts, Nuts, and Washers.
(2) Brushes (including Paint Brushes).
(3) Cotton Waste, Wipers, and Sponge Cloths.
(4) Chemicals, Acids, etc.
(5) Electrical Sundries.
(6) Engineers' Furnishings (Drills, Pliers, and other Tools).
(7) Files.
(8) Glass.
(9) Iron and Steel.
(10) Iron and Steel Castings.
(11) Ironmongery.
(12) Malleable Iron Castings.
(13) Oils, etc.
(14) Paints, Varnishes, and Transfers.
(15) Plumbers' Material (including Tubes and Fittings).
(16) Ropes, Twines, and Sand Bags.
(17) Soaps and Metal Polish.
(18) Tool Steel.
(19) Springs.

Offerers are required for the purchase of Scrap Metal (including Copper, Brass, Iron, and Steel).

Tenders are also required for—

(1) Steam Coal (Single Nuts, Beans, Peas, and Slack) required for the Generating Station, delivered in barges at Crown Point. Offerers may tender for six, nine, or twelve months' supply, and for the whole or part thereof.

(2) The supply of Household and Tar Pan Coal, delivered at the various offices and depôts as required.

(3) Sand, which must be clean and sharp, delivered in boats alongside River Wharfe, Sovereign Street.

Also Tie Bars.
Fish Bolts.
Cement.
Copper Bonds.
Cartage.

Conditions of contract and tender forms may be obtained on application to the undersigned.

Sealed tenders, marked "Tramways—Tender for Bolts, Nuts, and Washers," as the case may be, to be delivered to the undersigned, at the Tramways Office, City Square, Leeds, not later than 10 a.m. on February 16, 1914.

J. B. HAMILTON,
General Manager.

Tramways Offices, City Square, Leeds.

ELECTRIFICATION OF MELBOURNE SUBURBAN RAILWAYS.

The Agent-General for Victoria is prepared to receive tenders for:—

20,000-Volt and 1,500-Volt Underground Cables and Accessories for use in connection with the electrification of the Melbourne Suburban Railways now being carried out.

Specification and form of tender may be obtained from Messrs. Merz and McLellan, Consulting Electrical Engineers, 32, Victoria Street, Westminster, S.W., on or after Wednesday, the 4th of February, 1914. Any *bonâ-fide* tenderer requiring information in addition to that contained in the specification may apply to Messrs. Merz and McLellan, 32, Victoria Street, Westminster, S.W.

The charge for the specification, in duplicate, is £3 3s. and £2 2s. each for any further copies. Sums paid for copies will be refunded on receipt of a *bonâ-fide* tender for the whole of the works included in the specification. Cheques in payment for specifications, which should be crossed, must be made payable to the Agent-General for Victoria.

Sealed tenders, marked "Electrification of Melbourne Suburban Railways—Tender for 20,000-volt and 1,500-volt underground Cables and Accessories," are to be addressed to the Agent-General, and delivered at his office, Melbourne Place, Strand, W.C., not later than 12 noon on Thursday, March 5, 1914.

The Government do not bind themselves to accept the lowest or any tender, and ample security will be required from the contractor whose tender is accepted.

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COUNTY BOROUGH OF BOLTON.

TRAMWAYS DEPARTMENT.

The Tramways Committee of the Bolton Corporation invite tenders for the following Materials and Stores for the year ending March 31, 1915.

Varnish.
Trolley Pole Sundries.
Overhead Material.
Gear and Pinion Wheels.
Brake Blocks, Iron Castings, and Malleable Iron Castings.
Motor and Axle Grease.
Waste and Sponge Cloths.
Lighting Material, Mica, Fibre, I.R. Channel, Press-phan.

Forms and specifications of tenders may be obtained on application to Mr. John Barnard, General Manager, Corporation Tramways, Bradshawgate, Bolton, on and after Monday next, February 9, 1914. Sealed tenders, on forms provided, endorsed "————— Contract," to be addressed to the Chairman of the Tramways Committee, Tramways Office, Bradshawgate, Bolton, and must be delivered not later than Monday, February 23, 1914.

The Committee do not bind themselves to accept the lowest or any tender.

SAMUEL PARKER,
Town Clerk.

Town Hall, Bolton,
February 4, 1914.

CORPORATION OF IPSWICH.

ELECTRIC SUPPLY DEPARTMENT.

Tenders are invited for the following :—

Specification No. 70.—Supply of Paper Insulated Cables for continuous-current and alternating current three-phase systems.

Specification No. 71.—Supply of Fused Mains Disconnecting Boxes, as well as Service Boxes, suitable for use with 4-core L.T. three-phase A.C. paper insulated lead sheathed and armoured mains. Boxes must be of the combined pit and box type, with inner diving-bell cover.

Copies of either specification may be obtained from the undersigned in return for a deposit of £1 for each specification, which deposit will be returned upon receipt of a *bonâ-fide* tender.

Tenders to be in my hands not later than 10 a.m. on February 17 for Specification No. 70, and at the same hour on February 21 for Specification No. 71.

The Corporation does not bind itself to accept the lowest or any tender.

F. AYTON, M.Inst.E.E.,
Chief Engineer and Manager.

Constantine Road, Ipswich.

(Continued on page 94.)

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers,
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
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OVERHEAD LINE MATERIAL AND SUPPLIES.

E&Co

Whenever you are repainting your poles ask for samples of the Kearsley ready-mixed POLE PAINTS as supplied to important Companies at home and abroad. These Paints are durable, retain their colour during exposure, and prevent rust. Information free on request.
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RIPON, England.

MILLARS' TIMBER AND TRADING CO., LTD.
PINNERS' HALL, GREAT WINCHESTER STREET, LONDON, E.C.
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JARRAH
THE SANITARY
REGISTERED TRADE MARK M.J.
WOOD PAVING
Telegrams: "JARRAH, LONDON." *Telephone:* 368. LONDON WALL.

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GARRISON LANE, BIRMINGHAM.
Makers of Simplex Steel Conduit System and
WIRES and CABLES.
BITUMEN CABLES.
TRAMCAR HEATERS.
TRAMCAR METERS.
MEASURING INSTRUMENTS.
WATERTIGHT FITTINGS FOR CAR SHEDS.
ENCLOSED (Indicating) FUSES (to N.E. Code or English Standard).
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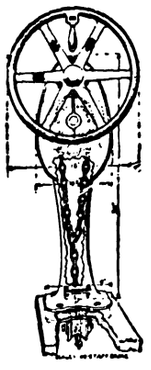

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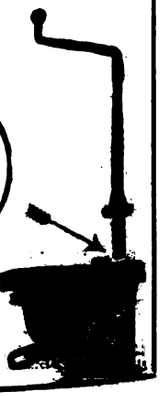

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THE
Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

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SATURDAY, FEBRUARY 7, 1914.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

NORTHERN COMMERCIAL MOTOR SHOW.

A more successful Exhibition of passenger, commercial, and industrial motor vehicles than that which closes in the City Hall, Manchester, to-day has never been held in the North of England. Thirty-six exhibitors staged two, and in some cases three and four, exhibits of petrol, petrol-electric, and steam vehicles, while the stalls devoted to tyres and accessories numbered twenty-three. The large number of visitors were either buyers or potential purchasers, and among them were numerous deputations from municipal authorities, including tramway committees and managers. Some half a dozen makers also had demonstration vehicles of various types outside the hall, and on Tuesday, Manchester 'Change day, the fleet was increased by one of the Daimler omnibuses, with Allen type bodies, run in connection with the Manchester tramways. The vehicle carried as passengers the members of the Tramways Committee, at whose instance the Corporation are applying for powers during the coming session of Parliament to enable omnibuses to be run in the city and in the districts of other local authorities where the Manchester tramways extend. By taking this course the Corporation will be able to ward off promoters who in other towns not supplied with road motors have begun to apply for licences. Manchester is already supplied with a large number of commercial motors operated by carriers of cotton and other goods for a distance of twenty miles or more from the city, but the field offers excellent opportunities for further developments in this direction. Thanks to its stone-paved roads in the central area and on the main arteries communicating with outside localities, the rulers of the cotton city are able to view the heavy traffic with equanimity. Another rapidly developing form of motor traction in the city is the running of char-a-bancs trips to places many miles distant. These popular vehicles constitute the most prominent feature of the Exhibition. Last summer they proved formidable competitors of tramway companies operating in inter-urban localities, and in several instances the companies were obliged to run similar conveyances for the protection of their own interests. A number of char-a-bancs shown at Manchester are provided with two bodies, one for passengers and the other for the conveyance of furniture or goods. The purchase of a goods body should render a char-a-bancs chassis of considerable utility to a tramway company during the winter season. Although it may not be advisable, in some instances, for a municipal tramway authority to engage in pleasure traffic, the possibility of finding a use for a char-a-bancs chassis in another department during the winter should serve to encourage its acquisition.

LONDON TRAFFIC REGULATION.

STOPPING PLACES OF TRAMCARS AND OMNIBUSES.

At Tuesday's meeting of the London County Council the Highways Committee reported the receipt of a letter from the Home Secretary on the question of stopping places for tramcars and omnibuses, a point in regard to which the Commissioner of Police was empowered by section 4 of the London Cab and Stage Carriage Act, 1907, to give directions. The letter said that in 1912 steps were taken to call meetings of representatives of the London County Council and of other parties concerned to endeavour to reach an agreement as to the directions to be given under the section above mentioned. The matter was postponed until the Select Committee on Motor Traffic had reported. That Committee in its report expressed itself strongly in favour of this method of dealing with the question. The Home Secretary concurred with the Select Committee on this point. He proposed, therefore, to instruct the Commissioner of Police to invite the various public bodies and companies controlling tramways and omnibuses within the Metropolitan police district to send representatives to New Scotland Yard to confer with representatives of the Commissioner and of the different road authorities with a view to arrive at an agreement as to the appointment of stopping places. The Home Secretary now expressed the hope that the Council would appoint representatives to take part in the conferences.

The Highways Committee, commenting on this letter, said they understood that it was proposed that the conferences should deal only with specific cases. The conferences would be in relation to details and not principles. The Committee thought that the Council should be represented, and the Home Secretary had been so informed. They had appointed their vice-chairman (Mr. G. H. Hume), Mr. H. H. Gordon, Mr. Theodore Prestige, and Mr. A. L. C. Fell, the chief officer of tramways, to attend all the conferences and in addition in cases in which such a course proved convenient or practicable it was proposed to arrange for the members of the Council for the electoral division affected by any proposal to be invited to attend the conferences.

The Committee also called attention to the present situation in regard to tramcars and omnibuses at Hammersmith Broadway. Quite apart from the large number of omnibuses allowed to stop in the Broadway, those running between Liverpool Street and Hammersmith which had hitherto passed through the Broadway to Brook Green Road now turned in the Broadway. Forty omnibuses an hour were turned at this place, and the congestion and the risk of accident were thereby very considerably increased. The Council had agreed to contribute £30,000 towards the cost of widening the Broadway (half of which was to be charged to the tramway account). A suggestion had been made that tramcars should not be permitted to stop in the Broadway for the purpose of taking up or setting down passengers, but the Committee were of opinion that that proposal was not reasonable. They recommended that the attention of the Commissioner of Police be drawn to the fact that omnibuses stopped and were turned in the Broadway, and that he be asked to take such action as would minimise the risk of accident to pedestrians and passengers using the tramways. The proposals were approved.

How to Increase Revenue.—Speaking at the annual dinner of the Rochdale Corporation tramway employees, Mr. George Webster, the general manager, said that the expenses of the undertaking were increasing year by year, and it was their duty to try to increase the revenue. He honestly believed this could be done by constant attention to duty and giving in return for their wages the best possible service they could to the Corporation and the public. They should keep a sharp look out for passengers at all times; they should not leave any stage without having a good look round; they should not leaves stages in front of schedule time; and they should see that all fares were collected. In a year they ran 600,000 trips averaging 2.8 miles each, and if during that time one halfpenny fare per trip run was not collected it would mean a loss of over £1,200 per annum to the department. Other speakers, who followed, congratulated Mr. Webster on his appointment to the managership.

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THE HARD CASE OF THE CAMBRIDGE TRAMWAY COMPANY.

Mr. Justice Astbury, in the Chancery Division of the High Court, on Tuesday, made an order for the compulsory winding up of the Cambridge Street Tramways Company. This was done on a petition by Cambridge Corporation. The company were incorporated in 1879 and undertook a certain liability for road repairs on the tramway route. In 1892 the Corporation agreed to take over the liability in consideration of the company paying £325 a year. In 1912 default was made in this payment, as the traffic, which is worked by horse cars, suffered from motor omnibus competition. For the company it was urged that the Corporation had licensed the omnibuses which caused the reduction in the company's receipts, and it was inequitable that the company should be wound up in respect of this debt, while the omnibuses paid nothing for the use of the streets. The petition should not be granted until Parliament had decided what steps should be taken to make omnibuses contribute to road maintenance. The Corporation had refused permission to the company to electrify the tramways. Mr. Justice Astbury, in making the order, said that the sum due was steadily mounting up. He could not keep the petition hanging about till Parliament had made up its mind as to contributions by omnibuses to road maintenance.

L.C.C. TRAMWAY MATTERS.

USE OF RESERVE FUND.

At last Tuesday's meeting of the London County Council the Finance Committee reported that the Highways Committee had informed them that it would be necessary to provide by March 31 next cash to a considerable amount, to meet expenditure on renewals and for revenue purposes. This would require the realisation of some of the investments held on behalf of the tramway renewals and general reserve funds. The balances standing to the credit of these funds on March 31, 1913, amounted to £906,795, nearly all of which was invested. It was impossible at present to state the exact amount needed, but the Committee understood that from £150,000 to £200,000 would probably be required. It was recommended that securities held on behalf of the tramway account should be realised, so as to produce such an amount as might be necessary not exceeding £200,000.

TRAMWAY WORKING ESTIMATES EXCEEDED.

Votes of £1,513,880 and £23,025 had already been passed during the current year for the working of the tramways, but it appeared likely that the sum already appropriated would be exceeded. The Highways Committee accordingly reported that it was necessary that supplemental estimates of £55,000 and £5,000 respectively should be approved. The excesses had occurred principally under the headings of repairs and traffic expenses, and were due to the additional number of car miles run beyond those anticipated when the estimates for the year were prepared.

These reports were adopted. The recommendations of the Highways Committee with reference to the stopping places of motor omnibuses and tramcars, referred to in another column, were also approved.

MISCELLANEOUS NEWS AND NOTES.

Liverpool Corporation have made an application to the Board of Trade for sanction to borrow £18,000 for additional cars.

Halfpenny Fares in Hull.—At a meeting of Hull Tramways Committee on January 28, it was resolved to try halfpenny fare stages on the Hessle Road route as an experiment.

Motor Omnibuses for Swansea.—It is announced that a company is in course of formation with the object of providing motor omnibus services between Swansea and outlying districts.

Dublin Tramways Assessment.—An agreement has been arrived at in the Recorder's Court, Dublin, fixing the valuation of the Dublin United tramways at £41,000 for three years from January 1, 1914.

The Railway Track Supply Company (of Great Britain) notify that their address on and after Saturday, February 14, will be 70½, Gracechurch Street, London, E.C., and their new telephone number, "Avenue 78."

Suggestion Box for Employees.—A box has been fixed at the Ilford tramways depôt for the reception of written suggestions by employees, such suggestions to be laid before the Tramways Committee from time to time.

Oxford Motor Omnibuses.—Mr. W. R. Morris has arranged, subject to the approval of Oxford Corporation, for the transfer of the motor omnibus licences, which he holds, to the City of Oxford Electric Tramways, Ltd.

New Omnibus Service for Manchester.—The Tramways Committee are considering a project to run omnibuses on a five-mile route embracing Chorlton, Stretford, Urmston, Davyhulme, and Barton Bridge. Residents at Didsbury and Burnage are also petitioning for a service.

Tramcar and Omnibus Stopping Places.—The National Society of Chauffeurs have forwarded the following resolution to the Commissioner of the Metropolitan Police:—"That the attention of the Commissioner of Police be drawn to the grave dangers resulting from the practice of allowing tramcars and omnibuses to use the same stopping-place, and that he be asked to issue an order forbidding omnibuses to stop within fifty feet of a recognised tramway stopping-place."

Colne Arbitration Award.—The arbitrator (Mr. Raw, K.C.) in the Colne light railway purchase has fixed the price at £92,830. The Colne and Trawden Light Railway Company asked for £170,000. while the buyers (Colne Corporation) offered £27,000.

Charge for Current to Aberdeen Suburban Tramways.—Aberdeen Electricity Committee have agreed to recommend a renewal of the agreement for a further period of five years for the supply of current to the Suburban Tramways Company, at the rate of 1¾d. in place of 1¾d. per unit.

Traffic Inducement at Belfast.—The City Council have decided to promote a Bill to authorise the expenditure of £15,000 incurred on the construction of the Bellevue Gardens, which have been formed in connection with the Glengormely section of the tramways.

Season Ticket Proposal for Guardians.—Replying to the Bournemouth Guardians, the Local Government Board have stated that they are unable to say what view the district auditor would take upon the question of tramway season tickets being issued to members of the Board at an annual charge.

Petrol-Electric Cars at Hastings.—The second of the twenty cars, which the Hastings Tramways Company are having converted to petrol-electric propulsion for use on the sea front, was put through its trials on the Esplanade tramways on February 5 by W. A. Stevens, Ltd. This firm are carrying out the conversions at their Maidstone works.

Concessions to Swindon Employees.—At a meeting of Swindon Town Council, on Tuesday, a report by a committee was adopted granting motormen and conductors a 54-hour week instead of one of 57 hours, increasing those men's wages by a halfpenny per hour, and granting them time and a-quarter pay for overtime above 54 hours per week of six days.

Issue of Maps at Bristol.—Besides fitting up the vehicles engaged in their 34 tramway and motor-ominibus services with route numbers, the Bristol Tramways and Carriage Company are preparing a map showing the routes, bearing numbers corresponding with those of the vehicles. The maps will be in two sizes—one for general public exhibition, the other for pocket use.

Amalgamation of Welfare Organisations.—The Rev. Dr. Darlington, the founder of the St. Mark's Tramwaymen's Brotherhood, the St. Mark's Taxi Drivers' Brotherhood, and the St. Mark's National Steam Omnibus Brotherhood, announces that the three organisations were amalgamated at the recent annual conference. The new title is the St. Mark's Traffic Workers' Brotherhood.

Birmingham Tramways Committee and Applicants for Work.—In consequence of injudicious support given by members of the Corporation and others to the applications made by men desirous of obtaining employment in the tramways department, the Tramways Committee have instructed the officials of the committee to ignore all letters from members of the Council presented by those seeking employment.

The Concessions to London United Tramways Employees.—On and from January 1 last the conductors, who formerly commenced at 4s. per day, will now receive 4s. 6d. for the first six months. 5s. for the second six months, 5s. 3d. for the third six months, and 5s. 6d. after four years. If they can qualify as motormen they will receive 5s. 6d. after 18 months' service. One fixed rest day will be provided in every fortnight for each service man.

Stockport to Oppose Manchester Omnibus Traction Powers.—In the Bill promoted by Manchester Corporation clause 25 provides powers to run omnibuses within the city, and along routes outside on which tramways are leased to or over which the Corporation have running powers. The Manchester tramways run into Stockport by way of Heaton Chapel and Heaton Norris. Stockport Tramways Committee have decided that the Bill should be opposed.

The Development of New York Subways.—In connection with the great scheme of new underground electric railways in New York, which is now being developed, the Public Service Commission for the first district of New York have executed seven new construction contracts for as many different sections of what is called the dual system of rapid transit. These contracts amount in value to $11,106,038. The Commission have also awarded a construction contract for a section of the Seventh Avenue subway at $2,292,943.

Increased Fares at Newport.—It was reported to the Tramways Committee on January 26 that the new scale of fares is producing an addition of £2,500 per annum to the revenue, but it is expected that this will be more than swallowed up for some years to come in the cost of relaying the track and renewing equipment generally. Mr. N. J. Young, the general manager, has prepared a scheme of payment for overtime for drivers and conductors after ten hours' duty per day at the rate of time and a quarter, and for grading car conductors up to a maximum of 28s. per week.

Question of Liability for Passengers' Parcels.—In an action brought against the Dunfermline and District Tramways Company for £1 15s., the value of a parcel, it was stated by plaintiff's wife that the conductor told her she should leave the parcel outside, being assured by him that it would be quite safe. The conductor took charge of the parcel and put it to the outside of the car. Afterwards it disappeared. Sheriff Umpherston decided that the plaintiff had no title to sue. The only contract which the defenders made was with his wife to carry her as a passenger, and it was made between her and the defenders' servant.

A Bradford Extension.—An extension of Bradford Tramways from Nab Wood to Bingley was opened on Tuesday. The new line is 1 mile 1,071 yds. long. The Lord Mayor of Bradford (Alderman J. Arnold) drove the first car over the new route, and Mr. J. Barrett, chairman of Bingley District Council, drove the second car. The permanent way was begun on September 1 last. The

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construction of the track and the erection of the poles, which were undertaken on behalf of and at the expense of the Bingley District Council, have been carried out under the supervision of Mr. W. H. S. Dawson, the Bradford city engineer and surveyor, and by the staff of his department at a cost of £25,000. The new tramway is to be worked, under the conditions of a lease entered into by the Bradford Corporation and the Bingley District Council, as a part of the Bradford tramways system.

Through Tickets on the Tubes, Omnibuses and London United Tramways.—The long-expected issue of through tickets on the Underground Railways, motor omnibus routes and the London United Tramways, which were promised two years ago as the result of the amalgamation of the three undertakings, is now being carried into effect. On February 1 such tickets were issued between well-known stage points in the south-west and western districts as regards the railways and omnibuses, while similar facilities were also available between the Central London Railway, the London United Tramways, and certain omnibus routes.

Leeds Tramway Offices.—At a meeting of Leeds Town Council, on Wednesday, Alderman R. A. Smithson, chairman of the Tramways Committee, moved the rescission of a resolution of the Council directing the Tramways Committee to obtain tenders for alteration to the Market Hall premises for the tramway department. He contended that the accommodation in the building in question would not be adequate. The motion was opposed on the contention that the building was sufficiently large, but it was carried by 37 votes to 15. Alderman Smithson then moved that plans and estimates should be prepared for building general offices for the tramways department upon vacant land belonging to the Corporation at the corner of Swinegate and Bridge End, and this motion was agreed to.

Dogs on Tramcars.—Having noticed that last summer a large number of visitors with small dogs had been refused admission to the cars owing to these animals being with them, Mr. Pilcher, general manager, recommended the Aberdeen Tramways Committee to allow dogs to be taken on the top deck when on a leash. A charge of 1d. could be made for each dog, and the conductor could be given power to refuse admittance to any dog which he considered objectionable. Mr. Pilcher reported that out of 28 large towns, there were 19 in which dogs were carried, under certain restrictions, and he suggested that the committee might consider the propriety of giving a trial to the carriage of dogs, with the restrictions mentioned, for a period of 12 months. By nine votes to five, the Tramways Committee rejected the proposal, and their action was confirmed by the Council.

Ordinary and Workmen's Fares by the Same Car.—It was reported to Paisley Council recently that a committee had seen Mr. F. Coutts, manager of the Tramways Company, with reference to the payment of ordinary fares on workmen's cars by persons other than workmen, pointing out that the Act provided for no such differentiation. Mr. Coutts had explained that no cars labelled workmen's cars were now run, but that during the prescribed hours workmen were allowed to travel on all cars at the reduced fares, other persons paying ordinary fares. Bailie Lochhead said that when workmen were allowed to travel on cars at workmen's rates, then the general public as passengers in the same cars should be entitled to travel at the same rate. Mr. Coutts might call the cars what he liked, but to all intents and purposes they were workmen's cars. The matter was referred back to the committee to confer again with Mr. Coutts.

New Bonus Scheme for Wallasey Tramwaymen.—In lieu of the existing bonuses the Tramways Committee have agreed to a scheme for granting a merit bonus to inspectors, timekeepers, drivers, conductors, and workshop regular staff, subject to deduction for failure to observe the orders and regulations of the department, but no deduction to exceed 5s. for each such failure. The merit bonus is to commence as from January 1, and to be payable on each of such officials being granted his annual holiday, viz.:—At the rate of 9d. per week for first year; 1s. per week after first year; 2s. per week after third year; 2s. 6d. per week after sixth year; 3s. per week after ninth year. All regular employees other than members of the office staff, inspectors, timekeepers, drivers, conductors, and those receiving the merit bonus, as decided by the general manager, are to be granted one day extra holiday per annum for each year's service after the sixth year with a maximum of twelve working days' holiday per annum.

The P.A.Y.E. System in Aberdeen.—The Tramways Committee after considering a report by Mr. R. S. Pilcher, the manager, regarding the adapting of existing cars for the P.A.Y.E. system, have recommended the Town Council that the manager be authorised to have the alterations carried out. Mr. Pilcher stated in his report that the six new cars at present being built would be ready for service about April next. He proposed to run those cars on the Mannofield route, but would require four of the ordinary cars to be altered to run along with them. It would be of great assistance in preparing the material if the committee would sanction the alterations for sufficient cars to adopt the P.A.Y.E. system on the Torry and Beach routes during the spring. In altering the open cars three steps would be placed at the entrance to the car, instead of two as at present, while the distance between the steps on the stairways would be reduced from 11½ inches to 9½ inches per step. That would be a great help to the many children who rode on that route. The seating accommodation on the top deck would be increased by six seats per car, and the present turnover seats removed, as passengers invariably found them inconvenient. He recommended that alterations be made to the rolling stock as follows:—Ten double-deck cars, £300; six open cars, £180—£480 in all.

Thanet Tramways Successful against Competition.—The Mayor of Margate (Alderman Reeve) was the guest at the annual dinner of the two sections of the employees of the Isle of Thanet Tramways and Lighting Company. Mr. A. J. Bousfield said the company had had a very successful year, and they had taken £36,200 in tramway receipts. This was a record in regard to the number of passengers in spite of very keen motor omnibus competition. The sum of £11,000 received from lighting showed a big increase. When Mr. Forde took over the management the income from lighting was £3,000, and the total income was £34,000, compared with £47,000. Mr. A. J. Forde, the manager and electrical engineer, mentioned that the conditions of the old employees had been improved, and in seven years the number of employees had risen from 130 to 230. They had had a record year as regarded passengers and their total receipts, and the working expenses showed that for every £100 revenue received it cost them £55 15s. He did not think there was a tramway system in the country whose operating expenses were so low, and had they the same conditions as at other places they could do much better.

Newcastle Jury and the Raising of a Car.—At an inquest held recently on a boy who was instantaneously killed by a tramcar at Wallsend, the jury intimated that they were satisfied that the occurrence was accidental, but they added that there was a feeling of indignation at the time that elapsed before the car was raised. Mr. Bateson, Deputy Town Clerk, explained that there was a breakdown gang continuously in attendance at the Haymarket depôt. They received notification of the accident at 7.55 p.m., and within five minutes the wagon was on its way to Wallsend. That place was reached at 8.25 p.m., and 10 minutes later the boy was extricated. The foreman asked if more jacks could not be kept at Wallsend. Mr. Little, manager of the Tyneside Tramways Company, stated that one of their inspectors, as soon as he heard of the accident, telephoned to Newcastle, and along with witness, tried to get their own breakdown gang out. By a pure accident, two of the men who drove the wagon were absent on some other duty, and that caused some delay. The two gangs arrived simultaneously. The Tyneside Tramways Company had apparatus which was capable of lifting the Newcastle Corporation cars.

PERSONAL.

Mr. Hugh Roger has been appointed by the National Electric Construction Company resident engineer at the Bo'ness electricity works.

Mr. A. T. Lambert, general manager of the Maidstone Corporation tramways, has been granted an increase in salary of £50 per annum.

Mr. J. Brown, traffic inspector of the Doncaster Corporation tramways, has been appointed traffic superintendent of the Ayr Corporation tramways.

Mr. Jose Pedriall, Administrator-General of the Anglo-Argentine Tramway Company, has been entertained at a banquet by the Italian community in Buenos Ayres in commemoration of the opening of the first underground tramway in South America.

Inspector Turner, of the London United Tramways, recently stopped the ninth runaway horse whilst he has been on duty at the junction at Hampton Court Green. Motorman Raymond, who grasped the offside rein, was struck by the shaft of the brougham, to which the horse was attached, and was picked up insensible. He has since been on the sick list.

Miss M. Simpson, who after nearly thirteen years' service as cashier to the Tynemouth and District Electric Traction Company, was recently appointed confidential clerk in the borough treasurer's office at North Shields, was presented with a gold pendant set with pearls and a gold chain at the annual dinner of the employees of the company. Mr. J. B. Williamson, one of the directors, made the presentation on behalf of the board. Mr. Jas. Davidson, the oldest member of the employees, handed Miss Simpson a gold bracelet which had been subscribed for by the staff.

Sir Edward White, as reported by the Highways Committee of the London County Council to a meeting of the Council on Tuesday, wrote a letter resigning his chairmanship of the committee and his position as the committee's representative on the General Purposes Committee, on the ground that his return to London had been delayed longer than he anticipated. He had expressed the hope that he might be able to resume his work on the Council about the middle of February, and in the circumstances the committee had asked him to continue in his office as their chairman until the end of the period for which he was elected. In regard to the representation of the committee on the General Purposes Committee, they had accepted his resignation of his position thereon, and had appointed their vice-chairman (Mr. J. H. Hume) as their representative in his stead.

CONTRACTS AND ORDERS.

J. Smith and Co., of Derby, have received a contract to supply uniforms for Derby tramway employees at £198.

The General Electric Company, Limited, have obtained through their China company for the third time the contract for "Osram" traction lamps for the Shanghai tramways.

Liverpool City Council have accepted the tender of the North Eastern Steel Company for 2,000 tons of grooved Sandberg silicon steel rails, and of Walter Scott, Limited, for 400 tons of Sandberg silicon railway section rails.

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Chloride Electrical Storage Company, Limited, have secured an order from Manchester Corporation for a battery of 264-b.n.w. cells, with a capacity of 2,760 ampere-hours at the 1-hour rate, or 5,520 ampere-hours at the 10-hour rate. The battery will be used in connection with a traction load.

Accrington Borough Council, on Tuesday, approved the recommendation of the Tramways Committee for the purchase of a third Collins' automatic point controller, two of which have been in operation for two or three years, and have proved very satisfactory. The Council also decided to make application for borrowing powers for £9,500 for the extension of car sheds and workshops.

London County Council have purchased the following tramway materials:—Feeder pillars, panels, switches, etc., Johnson and Phillips, £359 12s.; two sets 400lbs. furnace linings, 24 400lbs. crucibles, crucible stands, and crucible muffle rings, and 12 200lbs. crucibles, crucible stands, and crucible muffle rings, the Morgan Crucible Company, £138 4s. 2d.; 150 cwts. press-spahn in sheets 800 m/m by 600 m/m, Joseph Thompson, Sheffield, £240.

Northampton Tramways Committee have recommended acceptance of a tender of Messrs. Alex. Stark and Co., Glasgow, at £20,352 for the construction of tramway extensions to Far Cotton and Kingsthorpe; of a tender of the Brush Company for the supply of car bodies and trucks at £460 per car; and of a tender of Messrs. Dick, Kerr and Co. for the supply of electrical equipments for the cars at £289 14s. per car. When the recommendations came before the Town Council a debate took place on a counter proposal that the work of track construction should be carried out by the direct employment of labour at a cost estimated by the borough engineer at £20,922. The committee's proposals were, however, adopted by 35 votes to 8.

FINANCIAL REPORTS AND MEETINGS.

The Montreal Light, Heat and Power Company have declared a quarterly dividend of 2½ per cent. for the quarter ended January 31.

Walter Scott, Limited.—The directors have declared an interim dividend on the ordinary shares at the rate of 5 per cent. per annum for the half-year ended December 31, 1913.

Anglo-Argentine Tramways Company.—The issue of debenture stock this week was subscribed twice over. Shareholders have been allotted about 75 per cent. and the public about 25 per cent.

City of Buenos Ayres Tramways.—The directors recommend a balance dividend of 1s. 3d. per share, making 5 per cent. for the year, that £5,000 be transferred to the general amortisation fund, and that £168 be carried forward.

Blackpool and Fleetwood Tramroad Company.—The directors announce a final dividend of 4½ per cent. and a bonus of 2 per cent., making 8½ per cent. for the past year, adding £5,000 to the depreciation reserve, and £2,500 to the general reserve.

Guest, Keen and Nettlefolds, Limited.—The directors have declared an interim dividend for the six months ended December 31, 1913, at the rate of 5 per cent. per annum on the preference shares, and 10 per cent. per annum on the ordinary shares, both free of income tax.

Lancashire Tramways Company.—The net profits for the half-year ended December 31 were £17,567 after providing for debenture interest, and £7,093 was brought forward. A dividend at the rate of 6½ per cent. per annum is proposed, adding £11,000 to the depreciation fund and carrying forward £1,991.

Lanarkshire Tramways Company.—The net profits for the past year, including £7,093 brought forward, were £24,660 after placing £11,000 to reserve for depreciation. A final dividend at the rate of 6½ per cent. per annum is proposed, making 6¼ per cent. for the twelve months and leaving £1,990 to be carried forward.

Torquay Tramways Company.—The annual report shows a profit of £15,782. After deducting charges for debentures and adding the balance forward there remains £9,819. The directors recommend a dividend of 5 per cent., carrying forward £881. The number of passengers was 4,832,684, compared with 4,207,619 in 1912.

The London General Omnibus Company, Limited.—The directors have recommended the following dividend:—On the ordinary shares for the six months ended December 31, 1913, at the rate of £10 per cent., making with the interim dividend of £8 per cent. paid for the first half of the year, a dividend for the year 1913 of £18 per cent., with £175,000 placed to reserve and £34,197 carried forward.

The British Electrical Federation.—The traffic statement for the week ended January 30, 1914, shows that the receipts from tramways and railways amounted to £37,077, as compared with £36,493 in the corresponding week last year, and from omnibuses £11,575, as compared with £1,318, making a total of £48,652, as compared with £37,811. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year the receipts show an increase of £392 upon the week.

WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended January 31 amounted to £215,517, or £6,397 more than in the corresponding week last year, while the track mileage was 2,862, or 80 more than for the corresponding week. The receipts were at the rate of £75 6s. per track mile, an increase of 2s. 1d. per mile as compared with last year.

(Continued from page 90.)

BRADFORD CITY TRAMWAYS.

STEEL GIRDER TRAMRAILS.

The Corporation invite tenders for the supply and delivery at Bradford of Steel Girder Tramrails.

Drawing, specification, and form of tender may be obtained at the Office of Mr. W. H. S. Dawson, City Engineer and Surveyor, Town Hall, Bradford.

Sealed tenders, endorsed "Tender for Steel Tramrails," to be sent to me on or before Saturday, February 21, 1914.

The lowest or any tender will not necessarily be accepted.

FREDERICK STEVENS,
Town Clerk.

Town Hall, Bradford,
January 29, 1914.

CITY OF COPENHAGEN.

SUB-STATION MACHINERY AND SWITCHGEAR PLANT.

The Municipality of Copenhagen requires tenders for the delivery of three Motor-Generators or Converters, each 300 kw., with all appertaining A.C. and D.C. Switchgear.

Specification and conditions of contract may be had on application to "Elektrisk Station," Gothersgade 30, Copenhagen K, on payment of Kr.40, which sum will be refunded on return of the specification, accompanied by the tender.

Tenders to be sent to "Direktören for Belysningsvaesnet" Vognmagergade 8, Copenhagen K., not later than 12 o'clock noon, February 21, 1914.

KØBENHAVNS BELYSNINGSVAESEN.

CORPORATION OF NUNEATON.

ELECTRICITY DEPARTMENT.

The Electricity Committee of the Corporation of Nuneaton invite tenders for the supply, delivery, and erection of the following Plant:—

Section I. One 600 kw. High Pressure, Geared, Direct Current, Turbo-Generator complete with Fittings and Accessories.

Section II. Surface Condensing Plant suitable for the above.

Section III. Pipework, Valves, and Accessories in connection with the above Plant.

Single copies of the specification, conditions, and form of tender covering the whole of the above sections, together with plan showing the space available, may be obtained from the undersigned on payment of deposit of one guinea, which will be returned on receipt of a *bonâ-fide* tender. Further copies of the specification or plan may be obtained at a charge of 5s. per copy, which will not be returned.

Tenders will be considered for any or all of the above sections.

Sealed tenders, addressed to "The Chairman, Electricity Committee, Electricity Works, Nuneaton," and endorsed "Tender for 600 kw. Turbine," must be delivered not later than Saturday, February 21, 1914. The Committee do not bind themselves to accept the lowest or any tender.

S. CAMERON GIBSON, A.M.I.E.E.,
Borough Electrical Engineer.

Electricity Works, Nuneaton.

LONDON—INDIA OFFICE.

The Secretary of State for India in Council is prepared to receive tenders from such persons as may be willing to supply—

Rails and Fishplates.

The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at that Office by 2 o'clock p.m. on Tuesday, February 10, 1914, after which time no tender will be received.

H. J. W. FRY,
Director-General of Stores.

India Office, Whitehall,
February 4, 1914.

DICK, KERR & CO.,
Limited,
ABCHURCH YARD, CANNON STREET, LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

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PORTSMOUTH CORPORATION.

TRAMWAYS COMMITTEE.

The Tramways Committee of the above Corporation invite tenders for the supply of the under-mentioned goods, from April 1, 1914, to March 31, 1915 :—

Section A.—Ballast, Sand, and Grit.
" B.—Portland Cement (British manufacture preferred).
" C.—Brooms and Brushes.
" D.—Oils (not lubricating), Chemicals, Sheet Glass, etc.
" E.—Smiths' Coal and Coke
" F.—Timber.
" G.—Fodder.
" H.—Brake Blocks.
" I.—Engine Packings, Asbestos Goods, etc.
" J.—General Ironmongery (not including Tools).
" K.—Welsh Steam Coal.
" M.—Steel Tramway Tyres (200).
" O.—Wood Paving Blocks.
" P.—Car Repair Stores.
" Q.—Insulating Materials, Lamps, and Motor Windings.
" R.—Overhead Line Materials.
" S.—Lubricating Oils, Greases, etc.
" T.—Chandlery, etc.
" U.—Castings and Machined Parts.
" V.—Car Paints, etc.
" Va.—Car Varnishes.
" W.—Trolley Wire (9,180 yards).
" X.—Feeder Cable (780 yards, ·5 sq. in.).

The specification and form of tender may be obtained upon application to the Engineer, Mr. V. G. Lironi, M.I.M.E., A.M.I.E.E., Engineer's Offices, Fratton Grove, Portsmouth.

Tenders, marked "Tender for ————," to be delivered to the Town Clerk, Town Hall, Portsmouth, not later than 10 a.m. on Tuesday, February 17, 1914.

The form of tender must include a declaration that the person making the tender pays the rates of wages and observes the hours of labour and conditions contained in the Corporation Fair Wages Clause.

The Committee do not bind themselves to accept the lowest or any tender.

W. R. SPAVEN,
General Manager.

Town Hall, Portsmouth,
January 27, 1914.

COUNTY BOROUGH OF SOUTHEND-ON-SEA.

The Corporation of Southend-on-Sea invite tenders for the supply and delivery of Three Electrically Operated Coal Trucks.

For further particulars, apply to Mr. Robert Birkett, Borough Electrical Engineer and General Manager, London Road, Southend-on-Sea.

COUNTY BOROUGH OF WOLVERHAMPTON.

ELECTRICITY DEPARTMENT.

Tenders are invited for the supply, delivery, and erection of—

Steel Framework for Coal Bunkers.

Specification and form of tender may be obtained from the undersigned on payment of one guinea, which will be returned on receipt of a *bonâ-fide* tender. Extra copies may be obtained upon payment of 5s. for each copy.

Tenders, addressed to the Chairman of the Electricity Committee, Town Hall, Wolverhampton, must be sealed with wax, and endorsed "Tender for Steel Framework for Coal Bunkers," and delivered not later than noon on Monday, February 16, 1914.

The lowest or any tender will not necessarily be accepted.

S. T. ALLEN,
Chief Engineer and General Manager.

WALTHAMSTOW URBAN DISTRICT COUNCIL.

TRAMWAY TICKETS.

The Council invite tenders for the supply and printing of Tramway Tickets (a) with right of advertisement on back; (b) without right of advertisement on back.

Further particulars and form of tender may be obtained from Mr. Wm. Murray, A.I.E.E., Tramways Manager, Tramway Offices, Chingford Road, Walthamstow.

Sealed tenders, endorsed "Tender for Tramway Tickets," must be delivered, by post only, to the undersigned not later than 5 o'clock p.m. on Wednesday, February 25, 1914.

The contractors will be required to pay the whole of their workmen such rates of wages and observe such hours of labour as are recognised by the various trade unions and in force at the time of signing the contract.

C. SYDNEY WATSON,
Clerk to the Council.

Town Hall, Walthamstow,
February 3, 1914.

WALTHAMSTOW URBAN DISTRICT COUNCIL.

ELECTRICITY AND TRAMWAY DEPARTMENTS.

ANNUAL CONTRACTS FOR STORES.

The Walthamstow Urban District Council are prepared to receive tenders for the supply of the following Stores required for use in connection with the Electricity Supply Works and Tramways during the twelve months ending March 31, 1915 :—

ELECTRICITY DEPARTMENT.

1. Cables.
2. Jointing Materials.
3. Electrical Fittings and Accessories.
4. Arc Lamp Carbons.
5. Electricity Meters.
6. Ironmongery and Tools.
7. Lamps.
8. Engine Room Stores.
9. Lubricating Oils and Grease.

TRAMWAY DEPARTMENT.

10. Castings.
11. Car Accessories (including Steel Tyres).
12. Paints, Varnishes and Brushes.

Further particulars, with forms of tender, may be obtained from Mr. G. R. Spurr, Electrical and Tramways Engineer to the Council, Electricity Works, Priory Avenue, Walthamstow, on and after Monday, February 9, 1914.

Sealed tenders, endorsed "Tender for Cables," or as the case may be, to be delivered, by post only, to the undersigned not later than 5 o'clock p.m. on Wednesday, February 25, 1914.

The Council do not bind themselves to accept the lowest or any tender, and reserve to themselves the right to accept the whole or any part of a tender.

The contractors will be required to pay the whole of their workmen such rates of wages and observe such hours of labour as are recognised by the various trade unions and in force at the time of signing the contract.

C. SYDNEY WATSON,
Clerk to the Council.

Town Hall, Walthamstow.
February 3, 1914.

COPPER AND ALUMINIUM MARKET.

February 6, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

	Friday February 6.	Last week.	A Year Ago
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	55 2 6	65 17 6	66 15 0
" " (three months)	65 10 0	66 5 0	66 15 0
Electrolytic Copper—bars or ingots ..	68 0 0	67 15 0	74 0 0
Aluminium—bars or ingots	83 0 0	83 0 0	90 0 0

COAL MARKET.

February 6, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

	Friday, February 6.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	s. d.
Best Admiralty Welsh (large)	23 6	23 6	24 0	24 3
Best Seconds	23 0	23 0	23 6	23 6
Ordinary Drys	21 6	21 6	22 3	22 3
Best Washed Nuts	21 0	21 0	21 6	21 6
Best Washed Peas	19 6	19 6	20 0	18 9
Cardiff, f.o.b.—				
Best Admiralty (large) ..	19 0	19 0	19 0	19 3
Best Seconds	18 6	18 6	18 6	18 6
Ordinary Drys	17 0	17 0	17 3	17 3
Best Washed Nuts	16 6	16 6	16 6	16 6
Best Washed Peas	15 0	15 0	15 0	13 9
Newcastle, f.o.b.—				
Best Steams	14 6	14 6	15 3	14 0
Best Seconds	12 3	12 3	14 6	13 0
Smalls	6 9	7 0	10 6	9 6

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1913-3.	Latest Return. 1913-4.	Aggregate. Wks.	Aggregate. 1913-4.	Increase or Dec.
Anglo-Argentine	Jan. 28	£53,174	£55,028	4	£227,911	+ £8,741
Auckland..... (28 days	Jan. 16	21,653	25,633	29	135,538	— 3,674
Ballarat and Bendigo	Dec.	3 863	3,850	38	34 575	— 724
Brazilian St. Rly. Mlrs	Dec.	47,512	57,280	22	264,464	+ 45,611
Brazilian Traction	Jan. 24	84,639	94,026	4	378,914	+ 38,145
Brisbane	Dec.	25,890	29,145	52	3 6 216	+ 61,905
British Columbia ... $	Dec.	773,741	793,219	26	4,553,728	+ 302,902
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacroze	Jan.	44,601	48,651	30	316,546	+ 8,387
Calcutta.....Rs.	Jan. 31	61 392	64,474	5	2,45,372	+ 9,834
Cape Town	Dec	...	14,925	...	...	...
Carthagena & Herreria	Jan.	3.324	2,776	4	2.776	— 548
Cordoba	Dec.	12,266	12,863	39	120,313	+ 11,061
East India	Jan.	1,850	1,938	26	11,817	+ 437
Kalgoorlie.....	Dec.	3,208	2,907	52	34,510	— 8,300
La Plata.....	Jan.	5,575	5,296	4	5,296	— 279
Lima.....	Sept.	22,660	34,110	39	300,647	+ 23,788
Lisbon ..... Mlrs.	Sept.	...	144,538	...	...	...
Madras (14 days) Rs.	Jan. 31	26,530	28,836	4	28,189	+ 5,019
Melbourne	Dec.	...	69,000	...	...	...
Mexico ..... $	Dec.	633,102	611,673	52	6,813,046	+ 136,432
Montevideo.....	Jan.	38 061	38,256	18	102,095	— 72
Para	Feb. 1	4,123	3,203	9	30.004	— 6,224
Port Elizabeth.....	Dec.	...	4,967	...	...	...
Shanghai .....$	Jan. 28	18.967	26,600	4	97,000	+ 20.748
Singapore ..... $	Jan. 31	9,598	12,812	5	58,120	+ 5,000
Toronto ..... $	Nov.	742,156	849,279	48	8,893,984	+1,176,690
Winnipeg..... ..... $	Dec.	361,700	379,863	52	4,078,694	+ 313,310

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregates. Wks.	1913-4.	Increase or Dec.
Aberdeen Corporation..	Jan. 28	£1,334	£1,363	+ £29	35	£56,746	+ £3,181
Accrington Corp.....	,, 28	505	528	+ 23	43	24,862	+ 2,200
Ayr Corporation	,, 31	189	252	+ 43	37	14,365	+ 2,037
Bath Electric	,, 28	662	642	— 20	4	2,671	— 229
Birkenhead Corp.	Feb. 1	1,270	1,411	+ 141	44	56,905	+ 5,187
Birmingham Corp.	Jan. 31	11,485	12,125	+ 640	44	522,277	+ 43,472
Blackburn Corporation	,, 28	1,067	1,070	+ 3	44	57,478	+ 4,999
Blackpool Corporation	,, 29	440	461	+ 21	43	78,901	+ 12,259
Bolton Corporation.....	Feb. 1	2,403	2,720	+ 317	44	120,605	+ 6,786
Bournemouth Corp.....	,, 4	1,477	1,568	+ 91	44	91,520	+ 9,385
Bradford Corporation...	Jan. 31	5,166	5,435	+ 269	43	259,314	+ 15,148
Brighton Corporation...	Feb. 1	761	763	+ 2	44	47,879	+ 2,828
Bristol	Jan. 30	6,685	7,037	+ 352	4½	31,190	+ 679
British Elec. Federatn.	,, 30	37,811	48,652	*	...	...	...
Burnley Corporation ...	,, 31	1,517	1,614	+ 97	44	74,828	+ 7,894
Burton-on-Trent Corp.	Feb. 1	264	279	+ 15	44	13,000	+ 629
Bury Corporation.....	,, 1	1,183	1,256	+ 73	44	59,265	+ 2,214
Cardiff Corporation.....	Jan. 10	2,476	2,580	+ 104	41	112,415	+ 11,278
Chatham and District..	,, 29	791	737	+ 54	4	8,206	— 394
Chesterfield Corp.	,, 29	236	243	+ 7	43	11,294	+ 1,241
Colne & Trawden.....	,, 31	280	287	+ 7	5	1,138	+ 35
Cork Electric.....	,, 29	434	428	— 6	4	1,778	— 100
Croydon Corporation ...	,, 23	1,448	1,354	— 94	42	70,310	— 6,374
Darlington Corporation	,, 31	219	239	+ 20	44	10,972	+ 1 001
Derby Corporation	,, 31	851	901	+ 50	44	43,114	+ 3,865
Dover Corporation	,, 31	196	177	— 19	44	10,762	+ 695
Dublin & Lucan	,, 30	127	106	— 21	4	467	— 38
Dublin United	,, 30	5,460	5,134	— 326	5	21,646	— 2,157
Dundee City	,, 28	1,133	1,191	+ 58	37	48,627	+ 3,376
East Ham Corporation	,, 31	1,091	1,041	— 50	44	45,438	— 2,153
Exeter Corporation.....	,, 30	280	274	— 6	44	14,975	+ 600
Gearless Motor 'Buses.	,, 31	...	439	...	5	1.993	...
Glasgow Corporation ...	,, 31	18,660	20,158	+ 1,498	35	713,117	+ 50,316
Glossop(U.Elec.Supply)	,, 31	125	129	+ 4	5	592	— 11
Halifax Corporation ...	,, 27	1,811	1,823	+ 12	42	91,193	+ 3,233
Hastings & District.....	,, 28	702	616	— 86	4	2,583	— 301
Huddersfield Corp.	,, 31	2,028	2,062	+ 34	44	93,560	+ 4,658
Hull Corporation	,, 31	3,109	3,140	+ 31	44	139,178	+ 7,028
Ilford U.D.C.	,, 31	412	416	+ 4	43	19,761	— 991
Ilkeston Corporation ...	Feb. 4	114	126	+ 12	45	5,932	+ 850
Ipswich Corporation ...	Jan. 31	379	345	— 34	44	20,064	+ 647
Isle of Thanet	,, 31	264	260	— 4	18	6.102	+ 446
Kilmarnock Corp.	,, 31	152	160	+ 8	37	6.577	+ 423
Lanarkshire	,, 29	1 496	1,645	+ 159	4	7,601	+ 603
Lancashire United	,, 28	1,361	1,498	+ 137	4	6,058	+ 765
Leeds City	,, 31	7,641	7,996	+ 355	43	355,796	+ 14,205
Leicester Corporation...	,, 31	2,653	2,714	+ 61	5	12,103	+ 511
Leith Corporation	,, 31	629	655	+ 26	37	26,486	+ 1,203
Leyton U.D.C.	,, 15	1,183	1,278	+ 95	41½	55,975	— 231
Liverpool Corporation..	,, 31	11,861	12,643	+ 782	4	56,198	+ 2,227
Llandudno & Colwyn B.	,, 30	147	140	— 7	9	1,308	— 14
London County Council	,, 28	40,432	40,062	— 370	43	1,827,692	+ 5,274
London Gnl. Omnibus..	,, 31	51,974	53,172	+ 1,198	5	262,743	— 7,985
London United	,, 30	5,268	5,013	— 255	5	22,244	— 670
Lowestoft Corporation	,, 31	143	154	+ 11	17	3,261	+ 236
Maidstone Corporation	,, 29	156	152	— 4	44	8,936	+ 582
Manchester Corp.....	,, 31	16.695	17,076	+ 381	44	770,902	+ 33,321
Met. Elec. Trys.	,, 30	8,424	7,958	— 466	5	34,928	— 1,208
Nelson Corporation.....	,, 31	202	178	— 24	44	9.189	+ 498
N'castle-on-Tyne Corp.	,, 31	4,508	4,972	+ 464	44	216,179	+ 19,540
Newport (Mon.) Corp....	,, 31	706	739	+ 33	44	33,814	+ 2,379
New St. Helens & Dist...	,, 28	676	686	+ 10	31	25,303	+ 2,325
Northampton Corp	,, 30	512	503	— 9	44	25,205	+ 1,450
Nottingham Corp.	,, 29	3,196	3,187	— 9	43½	145.724	+ 6,223
Oldham Corporation ...	Feb. 1	2,034	2,096	+ 62	45	99,213	+ 6,889
Portsmouth Corp.....	Jan. 31	1,706	1,735	+ 29	44	99,487	+ 6,332
Preston Corporation ...	,, 28	812	772	— 40	44	38,831	+ 2,349
Provincial	,, 31	1,554	1,558	+ 4	17	30,317	+ 1,654
Reading Corporation ...	,, 29	584	645	+ 61	43	30,413	+ 2,135
Rochdale Corporation	,, 31	1,439	1,475	+ 36	44	70,353	+ 2,874
Rotherham Corp.....	Feb. 4	860	1 071	+ 211	44	44,883	+ 9,446
Salford Corporation ...	,, 2	4,774	5,072	+ 298	44	230,302	+ 10,406
Sheffield Corporation...	,, 1	6,957	7,514	+ 558	44	329,969	+ 24,371
Southampton Corp.....	Jan. 28	1,156	1,073	— 83	43	57,275	+ 3,028
Southend-on-Sea Corp.	,, 23	529	583	+ 44	44	41,154	+ 6,982
South Met. Trys.	,, 30	700	922	+ 222	5	4,078	+ 1,007
South Shields Corp.....	,, 31	617	670	+ 53	44	31,674	+ 3,613
Sunderland Corp.	Feb. 1	1,251	1,421	+ 170	44	63,711	+ 5,926
Sunderland District ...	Jan. 28	519	586	+ 67	13	7.361	+ 835
Swindon Corporation ...	,, 28	149	136	— 13	43	7,205	+ 385
Trys. (M.E.T.) 'Buses	,, 31	...	7,895	...	5	35.056	...
Tyneside Trys. & Tmrds	,, 98	437	455	+ 18	4	1,782	+ 73
Wallasey Corporation ...	,, 31	983	1,070	+ 87	44	53.447	+ 4,794
Walsall Corporation ...	,, 31	598	629	+ 31	5	2 673	— 44
Walthamstow U.D.C....	,, 31	625	659	+ 34	44	32,719	+ 1,218
Warrington Corp	Feb. 1	469	463	— 6	40	17,732	+ 473
West Ham Corporation	Jan. 29	2,645	2 478	— 167	43	118,400	+ 3,541
Wigan Corporation.....	,, 29	1,405	1,422	+ 17	43½	64,951	+ 5,950
Wolverhampton Corp	Feb. 4	1,014	1,108	+ 94	45	48,331	+ 2,379
Yorkshire (W. Riding)	,, 1	1,283	1,469	+ 185	5	6,877	+ 566

* From such of the services as were working both last year and this year the receipts show an increase of £393 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London.....	Jan. 31	£5,673	£5,106	— £567	5	£26,347	— £1,713
City and South London	,, 31	3.082	2,792	— 290	5	14,632	— 968
Liverpool Overhead.....	Feb. 1	1,544	1,6 7	+ 103	5	8,408	+ 320
London Electric.....	Jan. 31	14.953	14,2 5	— 690	5	74,190	— 670
Mersey	,, 31	2.310	2,3 3	+ 23	5	11,329	+ 10
Metropolitan	Feb. 1	16,649	17 933	+ 1.284	5	91,103	+ 7,494
Metropolitan District	Jan. 31	13,273	12.900	— 373	5	65.949	— 776

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TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, February 6.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	70 — 73
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	...	4⅞ — 5⅛
5	Do. 5½% Cum. 2nd Pref.	...	4⅜ — 4½
100	Do. 4% Deb. Stk. Red.	+ 2	91½ — 93½
100	Do. 4½% Deb. Stk. Red.	+ 1	96½ — 99½
100	Do. 5% Deb. Stk. Red.	+ ½	96½ — 98½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 — 106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅝ — ¾
1	Do. 5% Cum. Pref	...	⅝ — ¾
100	Do. 4½% 1st. Mort. Deb. Stock, Red.	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	+ 1½	85½ — 87½
10	Blackpool and Fleetwood Tramroad Co.	...	13½ — 14
	Bombay Elec. Supply and Trams. Co., Ord.	...	13½ — 14½
10	Do. do. 6% Cum. Pref.	+ ¼	10¾ — 11¼ xd
100	Do. do. 4½% Db. Stk Rd.	+ 1	94½ — 96½
$100	Brazilian Traction Light and Power Co. Lim.	— 1½	91 — 93 xd
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	...	7½ — 8½
5	Do. do. 5% Cum. Pref	...	4⅞ — 5⅜
100	Do. do. 4½% 1st Deb Stock, Red.	...	97 — 100
10	Bristol Tramways and Carriage Co.	— ¼	5¼ — 5⅜
10	Do. do. 4% Cum. Pref.	...	6¼ — 7
100	Do. do. 4% Deb. Stock	...	100 — 102
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	+ 1	120 — 124
100	Do. Pref. Ord. Stock	+ 1	107 — 111 xd
100	Do. 5% Cum. Perpetual Pref. Stock	...	102½ — 105½
100	Do. 4½% 1st Mort. Debs.	...	98 — 101
40	Do. 4½% Vancouver Power Debs.	...	94 — 98
100	Do. 4½% Perpetual Cons. Deb. Stk.	+ 2	95 — 98
100	British Elec. Traction Co., Lim., 6% Cum. Pref.	+ 2	92 — 95
100	Do. 7% Non-Cum. Pref.	+ 3	58 — 61
10	Do. 6% Pref. Ord. Non-Cum.	+ 4	16 — 18
100	Do. Deferred Ord. Stock	+ 2¼	7½ — 9½
100	Do. 5% Perpetual Debenture Stock	...	93 — 96
100	Do. 4½% Second Debenture Stock, Red	+ 1	79 — 82
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	+ 6	73 — 78
100	Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb.	+ ½	100½ — 102½
5	Calcutta Tramways Co., Limited. Ord.	...	6 — 6¼
5	Do do. 5% Cum. Pref.	...	5 — 5¼
100	Do. do. 4½% 1st Deb. Stock, Red.	...	96 — 99
1	Cape Electric Tramways, Ld.,	...	⅝ — ¾
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	3 — 3¼
100	Do. 5% Debs., Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co. (1904), Lim.	...	5⅛ — 5⅛
100	Do. 4% Debenture Stock Red, 1985	...	91 — 96
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.	...	89 — 98
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	...	95½ — 97½
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	— 1½	— 6⅞
10	Dublin United Trams. Co. (1896) Lim. Ord.	...	— 11
10	Do. do. 6% Pref.	+ ⅜	— 12½
100	Do. do. "A" Red.	...	— 80¼
100	Do. do. Deb. Stock "B" Red.	...	— 77
10	Gateshead & Dist Trys. Co., Ord.	...	8¾ — 9¼
10/-	Hastings & Dist. Electric Trams. Co., Ld., Ord.	...	⅛ — ⅜
1	Do. do. 6% Cum. Pref.	...	⅝ — ¾
100	Do. do 4½% Deb. Stk. Red.	...	66 — 71
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	93½ — 97½
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)	...	86 — 90
10	Imperial Tramways, Ord.	— ½	3¼ — 3½
10	Do. do. 6% Cum. Pref.	...	6¼ — 6½
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.	...	2 — 2½
100	Do. 4% Debenture Stock	...	71 — 76
1	Kalgoorlie Elec. Trams., Ltd.	...	0 — 1/16
100	Do. do. 5% "A" Deb. Stk.	...	85 — 90
100	Do. do. 6% "B" do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.	...	¾ — 1
10	Lanarkshire Tramways Co.	...	10 — 10½
100	Lancashire United Tramways, 5% Prior Lien Deb.	+ 1	81 — 83
1	Lisbon Electric Trams., Lim., Ord.	...	1⅛ — 1⅜
1	Do. 6% Cum. Pref.	...	1⅛ — 1⅜
100	Do. 5% Mort. Debs.	...	91 — 96
1	London and Suburban Trac. Co., Lim., Ord.	...	¾ — 15/16
100	London General Omnibus Company, Limited, 4½% Deb.	+ 1	97 — 99
	Do. Do. 5% Cum. Inc. Deb. Stk. Red.	...	92 — 95
100	London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red	+ 1½	65 — 68
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref.	...	4⅞ — 5¼
5	Do. do. 5% Deb. Stk., Red.	...	101 — 103
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	79 — 82
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	...	114½ — 117½
$1,000	Do. do. 5% Bds.	+ ½	98½ — 100½
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	⅞ — 1
100	Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red.	+ 6	90 — 93
100	Do. 5% Deb. Stock, Red.	+ 2	89 — 92
100	Mexico Tramways Co., Common Stock	...	74 — 77
500	Do. Gen. Con. 1st Mort. Gld. Bonds	— 2	83 — 88
100	Do. 6% 50-yr. Mort. Bonds	...	85 — 89
...	Michigan United Railways 5% 1st Mort. Gld. Bonds	...	91½ — 93½
100	Montreal Street Railway, Sterling 4½% Debs. (1922)	+ 1	98 — 100
100	Do. 4½% Sterling Debs, (1922)	+ 1	99 — 101
1	National Steam Car Co. Ltd.	— 1/16	¾ — ⅞
10	Oldham—Ashton and Hyde Elec. Ord.	...	5⅞ — 6½
10	Do. do. 5% Cum. Pref.	...	5⅞ — 6½
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	5 — 5½
5	Do. do. 6% Cum. Pref.	...	4½ — 5
1	Perth (W.A.) Elec. Trams., Ld., Ord.	...	1½ — 1¾
1	Potteries Electric Traction Co., Ltd., Ord.	...	⅜ — ⅝
1	Do. 5% Cum. Pref.	...	1/16 — 1/8
130	Do. 4½% Debenture Stock, Red.	...	84 — 87
1	Provincial Tramways, Lim., Ord.	...	⅝ — ¾
10	Do. 5% 1st Deb. Stock	...	95 — 98
...	Puebla Tramway, Light & Power Co., Prior Lien 5%	+ 5	81 — 85
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.	...	5 — 5½
100	Do. do. 4½% 1st Mt. Db. Stk.	+ ½	95 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	+ 1½	89 — 91
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	+ 1	101 — 103
100	Do, do. 5% 50-yr. Mort. Gold Bonds	+ ½	95½ — 97½
100	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	+ 2	100 — 103
$500	Do. 5% 1st Mort. Debs., Red., 1929	+ 1	101 — 104
10	Shanghai Elec. Construction Co.	+ 1	11¼ — 12¼
100	Singapore Elec. Tramways Lim., 5% Debs. Red	...	87 — 91
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref.	...	⅝ — ¾
100	Do. do. 4% Deb. Stk.	...	66 — 70
...	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	98 — 100
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	98 — 100
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	82 — 84
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	93 — 95
5	United Elec. Tramways of Monte Video, Ord.	+ ⅛	4⅝ — 5⅛
5	Do. do. 6% Cum. Pref.	...	4⅞ — 5⅛
100	Do. do. 5% 1st Deb. Stk. Red.	...	94 — 97
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	95 — 97
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	1/16 — 1/8
5	Do. do. 6% Cum. Pref.	...	3½ — 4½
100	Do. do. 4½% 1st Deb. Stock. Red.	+ 1	80 — 85

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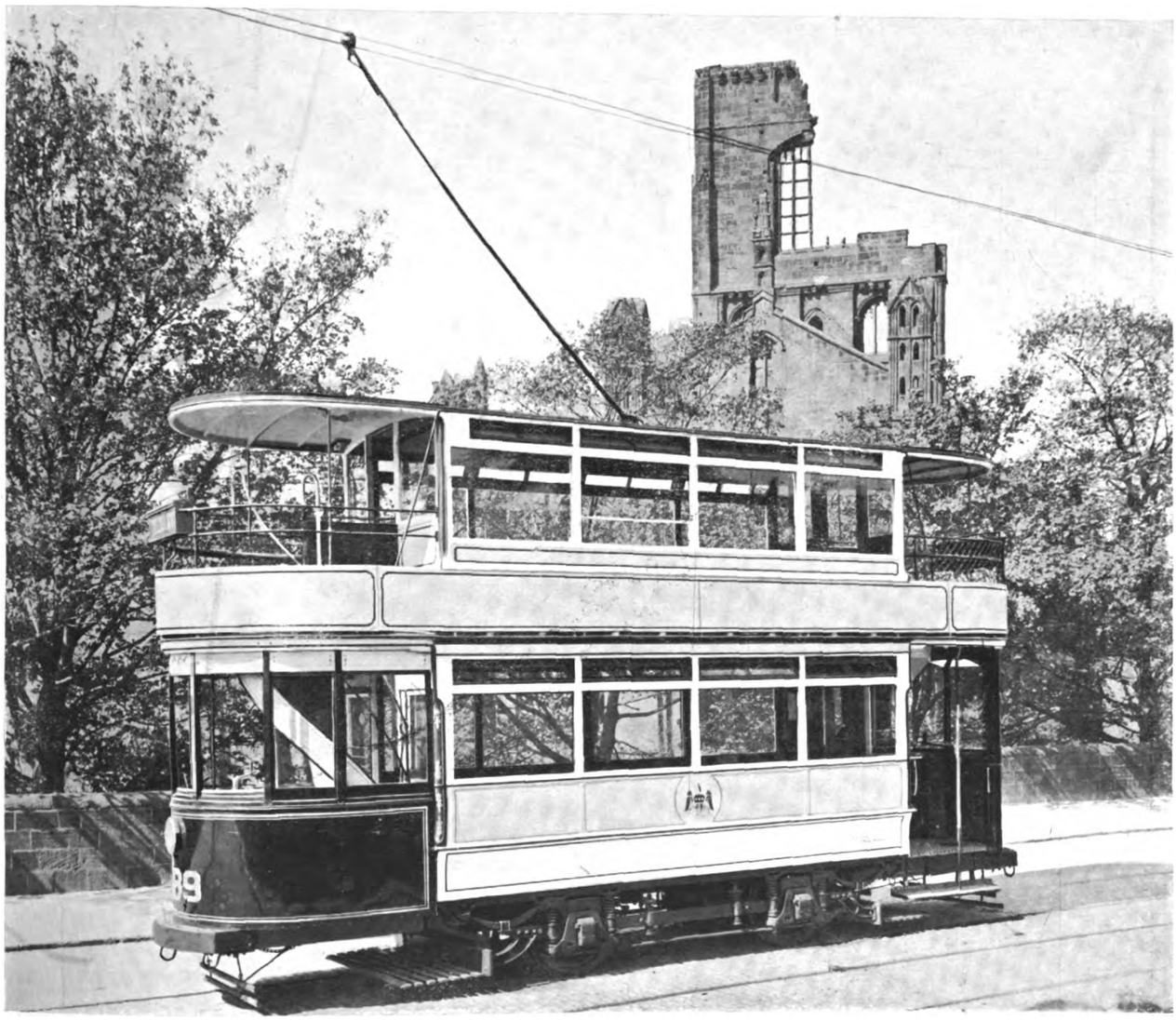
THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

FOUNDED 1892. LONDON, FEBRUARY 12, 1914. VOL. XXXV.

STANDARD CAR OF THE LEEDS CITY TRAMWAYS.

Experience with electric traction in this country, now spread over a good many years, has led among other things to standardisation in practice in various directions. This applies to cars as well as to other things, and to the casual eye the cars used in many of the great towns in this country appear very similar. It is true that the double-truck bogie cars are largely used, but speaking generally the four-wheeled car finds favour as being lighter and handier. Even in the four-wheeled car, however, there are differences in detail, partly called for, no doubt, by local conditions, and partly due to the various ideas of managers and engineers. The roof cover has become quite general, and after much discussion the use of the vestibule is at length largely increasing. In order to show clearly what is the present practice in different towns, we



Standard Car of the Leeds City Tramways at Kirkstall Abbey.

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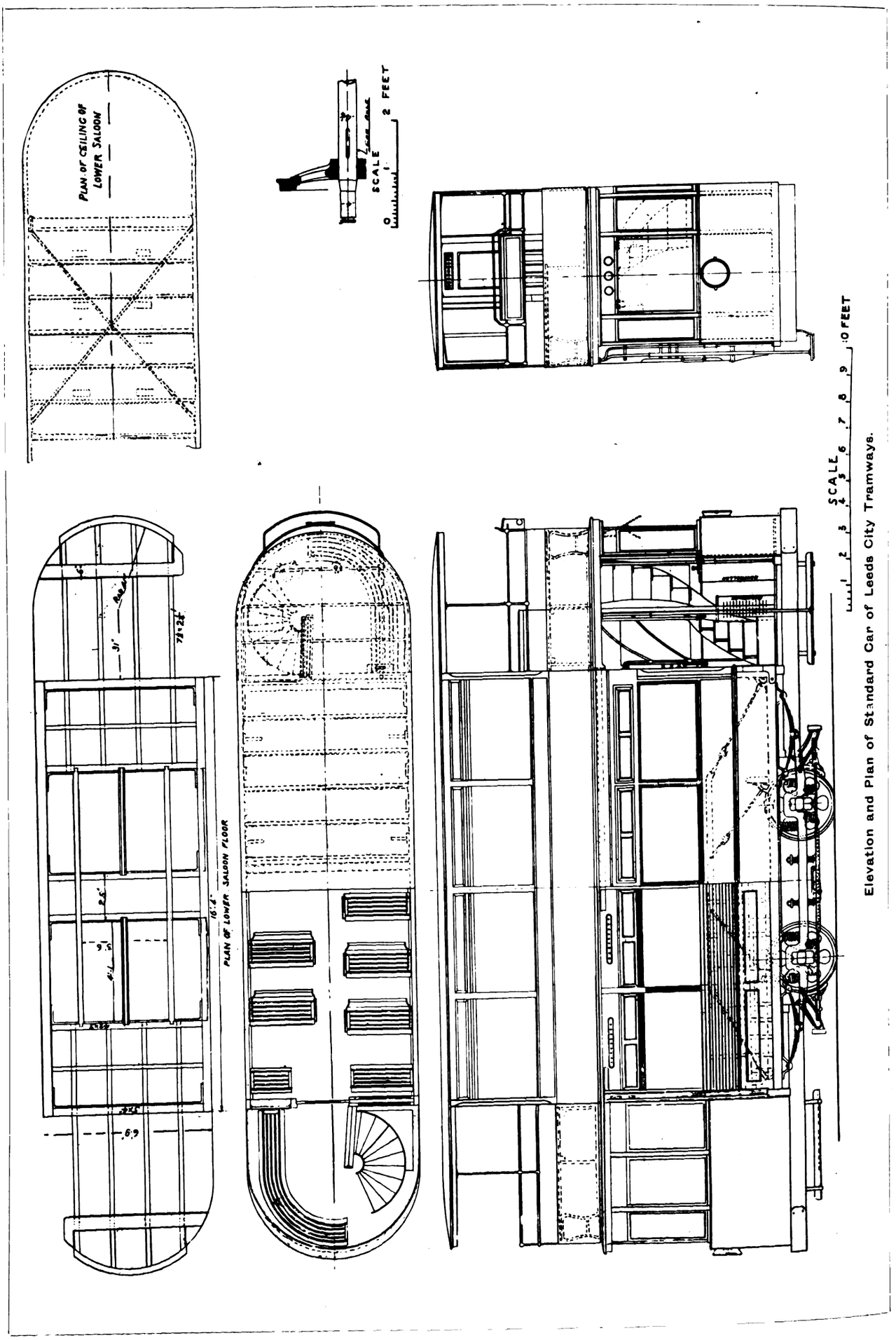

Elevation and Plan of Standard Car of Leeds City Tramways.

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propose to publish from time to time views and drawings of standard cars as employed by various tramway authorities.

The accompanying illustrations show the type of car which has been adopted by the Corporation on the advice of Mr. J. B. Hamilton, the general manager, as the standard type for the Leeds City Tramways. It is the form considered most suitable for the busy streets of such an industrial city as Leeds, where there is much short-distance travel, and also a large demand for long journeys to and from the suburbs. The bodies of these cars, which are built in the Corporation's works, are of the double-deck type, with roof canopy and end vestibules. The ends of the upper deck are not enclosed, so that 10 passengers on each car may, if they so desire, have seats in the open air. Thus the doorways of the upper saloon are directly above those of the lower. The staircase is of the reversed type, giving full security to the passengers, and landing them on the centre line of the upper deck. The seats afford accommodation for 36 passengers on the upper deck and 22 on the lower—total, 58. This is obtained with an over-all length of 30 ft., and a body length of 15 ft. 8 in.

The bodies are mounted on Brill trucks, equipped with wide-wing journal boxes. The wheel base of 6 ft. 6 in. has its effective length of support extended by springs, so that the spring base is 15 ft., or nearly as much as the whole inside length of the car body. The wheels have cast-steel centres and steel tyres. They are 32½ in. in diameter, and their axles are 4¼ in. in diameter. It is interesting to note that no breakages of these axles took place in 1912 or in 1913. The detail construction may be gathered from the accompanying drawings. Maley electro-mechanical combination brakes are used. The electrical equipment consists of two D-K9 motors of 40 H.P. each, and the controllers are also of Messrs. Dick, Kerr and Company's make, some of DB form K1, and some of DB form K3. The main motor switches, automatic circuit breakers, and magnetic blow-out fuses are also of the Dick-Kerr type. Axles, gears, and pinions are of steel, with machine-cut teeth.

The following table gives the leading dimensions of the cars:

	ft.	in.
Length over all	30	0
Length of body (outside)	16	4
Length of body (inside)	15	8
Length of each platform	6	0
Width over all	7	0½
Width over side pillars	6	9
Width over floor sills	6	0
Clear height of lower saloon at centre	6	4
Clear height of top saloon at centre	5	10½
Height of end door openings, lower saloon	6	0
Height of end door openings, top saloon	5	9
Width of door openings, top and bottom saloons	2	3
Height from rail to under side of trolley standard	15	8
Height of floor above rail	2	10
Total height from rail level over trolley base	16	1
Weight, completely equipped, but empty	10½ tons	

No drawbar is fitted to these cars, but a chain is kept on each car for towing if disabled. The collision fenders are of oak, protected by 6 in. by ½ in. steel plates. Life-guards are of the Tidswell type, now generally used throughout the United Kingdom. Leeds tramways were, we believe, the first to adopt this design. Sand boxes are of what is called the "common-sense" type. All lamps in the car are of 16 candle-power, and each car has one head light, one rear platform light, two top-deck lights, five lamps in the upper saloon and six lamps in the lower saloon. There are also six 8 candle-power lamps for the illuminated destination signs.

BENZOL-ELECTRIC TRAIN FOR THE KHEDIVE OF EGYPT.

The Khedive of Egypt is the first ruler to provide himself with a train worked by a benzol engine and electric generator. The train illustrated on next page has recently been purchased by him for use as a State train. It consists of a saloon coach, and a composite coach for the suite and attendants. Each of the two coaches is equipped with an internal combustion engine, a dynamo, and electric motors, and the train can be controlled from either of the driver's compartments at each end. The division of the machinery between the coaches offered the material advantage of a better distribution of the weight. When reversing the direction of travelling the front coach is not impelled by the rear coach (an arrangement which is undesirable at high speeds), and it also becomes unnecessary to shunt the coaches. If a defect occurs in one of the combustion engines or electrical machines the train can be propelled at a reduced speed by the set which remains intact. The principal dimensions of the cars are as follow:

	Saloon coach.	Composite coach.
Length over buffers	60 ft. 0 in.	63 ft. 0 in
Length of coach body	45 „ 5 „	48 „ 5 „
Width of coach	9 „ 3 „	9 „ 3 „
Height from rails to roof	14 „ 8 „	14 „ 8 „
Height inside coach body	9 „ 5 „	9 „ 5 „

The train is intended to travel at a speed of 40 miles per hour on the level; the total train weight without passengers is approximately 100 tons.

Each coach is mounted on two 2-axle bogie trucks. The benzol-electric sets are mounted in the two bogie trucks, one at each end of the train, the four electric motors being placed in the centre bogie trucks. The combustion engines are fixed to a special inner frame which is supported from the axles by springs, so that with the ordinary double-spring suspension of the coach body from the axles, a triple-spring suspension is obtained between the coach body and the motor, thus eliminating all vibration. The engine bogie trucks are placed so far in front of the coaches that the engines and auxiliary machinery are completely exposed when the bonnets are removed; the electrical machinery is accessible in the customary manner through openings in the floor. The radiators are mounted on the roof above the two driver's compartments, and the connecting pipes between the engine and radiator and the exhaust are contained in the chimney in the front of each coach, visible in the illustration.

The saloon coach contains one large reception saloon, a private saloon, and the necessary additional compartments, while the composite coach consists of various passenger compartments and a baggage compartment. The two coaches are connected to one another by a flexible gangway.

The machine set of each coach consists of a combustion engine with its auxiliary machinery, and the electric generator and exciter, the latter machines being coupled to the engine by a flexible leather belt coupling. The combustion engine was supplied by the N.A.G.; it has four cylinders placed behind one another, and gives a continuous output of 120 H.P. at a speed of 700 revolutions per minute. It will operate either with benzol or petrol. The valves are all placed on one side, and are actuated by a common shaft; the admission and exhaust valves are interchangeable. The crank shaft has four cranks set at angles of 90 deg. to one another, and is supported in three bearings. Lubrication is carried out by means of an oil pump

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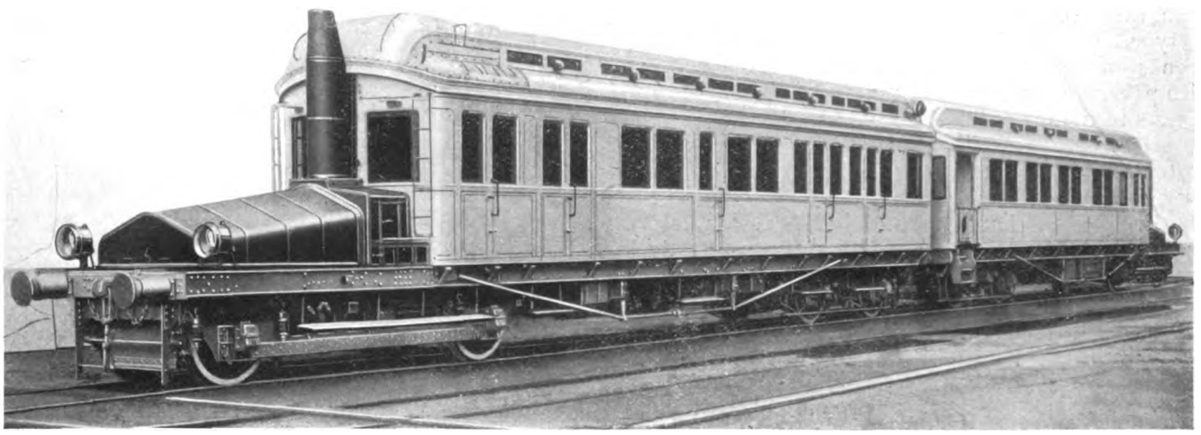
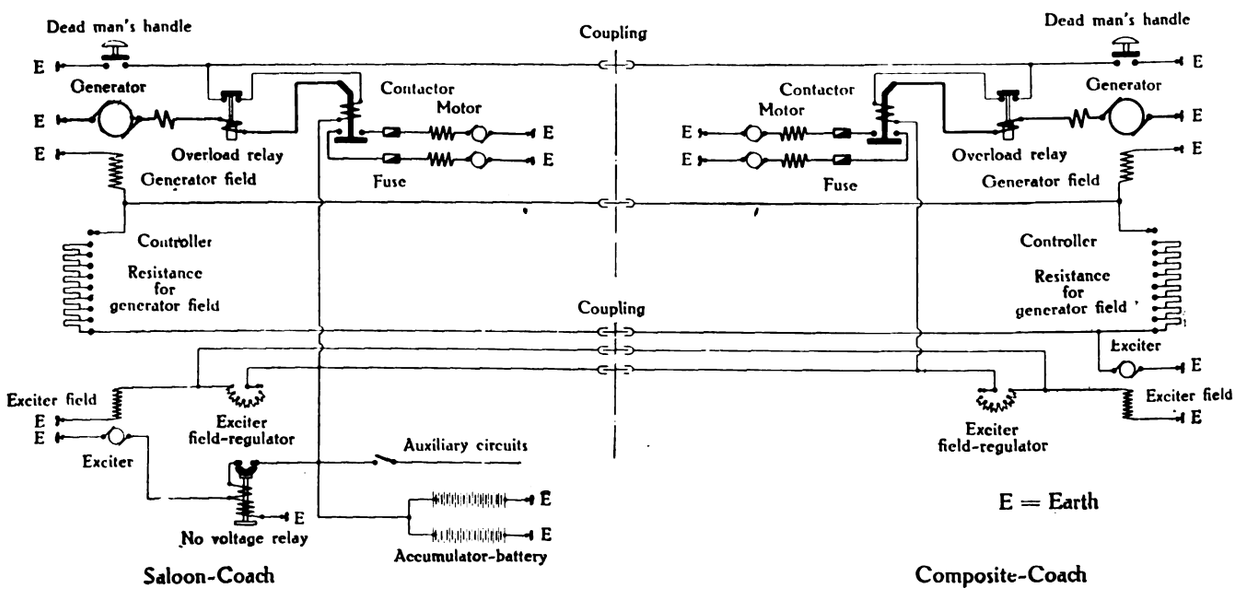
which causes the oil to circulate under pressure. The engine drives a compressor which supplies the compressed air for the various air tanks. The engine is started by means of compressed air from the starting tank. The cooling of the engine is accomplished by means of air-cooled water which is kept in circulation by a centrifugal pump. The pump drives the water through a honeycomb radiator mounted on the roof of the coach, and in addition to the natural draught when travelling, it is cooled by an electrically-driven fan with a vertical shaft, mounted on the coach roof. The fuel tank is suspended from the machine bogie truck; the fuel in the tank is kept under the pressure of a neutral gas, such as nitrogen or carbon-dioxide, which is drawn from a steel cylinder through a pressure-reducing device; this cylinder, which is attached to the bogie truck, can be exchanged when necessary. The foregoing arrangement ensures absolute immunity from explosion. The speed is regulated by a centrifugal governor; the latter is provided with a speed-adjusting device operated electrically from the controller in the "out" position, by means of which the speed of the combustion engine can be reduced to about one-third when the coach is stationary. By this means the noise caused by the engine when the train is not moving is appreciably reduced, the saving of fuel being also considerable. A Bosch high-tension magneto apparatus is used for the ignition, battery ignition being provided as a reserve. The exhaust gases are led over the roof into the open air through a silencer suspended in the chimney by springs, and having a flexible connection with the engine.



Two-Car Benzol-Electric Train for the Khedive of Egypt.

The generator in each machine set has an hourly rating of 80 KW., and a continuous rating of 50 KW., and the exciter has an output of 3·5 KW. Both machines are cooled by a fan mounted on the same shaft. The generator pressure is 300 volts, the exciter pressure being 60 volts. The generator has auxiliary poles, and can be overloaded at starting with a current not exceeding 500 amperes. Each coach is equipped with two series-wound auxiliary pole motors, each having an hourly rating of 80 H.P. at 300 volts; they work on to the axles of the motor bogie trucks through gearing having a ratio of 1 : 2·6. The control and speed regulation are carried out in accordance with the Ward-Leonard system, *i.e.*, by regulating the generator voltage; one innovation has been introduced in the present instance, however, as the control of both generators



Electrical Connections of Benzol-Electric Train.

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may be carried out in common from either of the driver's compartments. The system of connections is shown in the drawing. The motor circuits in both coaches are separated from one another, and the generator of one coach only feeds the two motors of the same coach, so that heavy cable couplings are not required. The necessary safety precautions in the form of fuses, overload release, arrangements for breaking the circuit on

Interior of Saloon Coach of Benzol-Electric Train.

releasing a press button on the controller, are also provided. The reversers operated from the master controller are placed in each coach for reversing the direction of travelling. In the field circuit, the one exciter excites the two generator fields connected in parallel, through a common resistance, the steps of which are gradually short-circuited by the controller at starting. As may be seen from the diagram, one of these resistances is placed in each coach, *i.e.*, one for each controller, so that only one of them is in use at a time. The two exciter fields connected in parallel are fed in a similar manner from a small auxiliary battery to which the second exciter is connected in parallel. When the combustion engine is running at a low speed this exciter is switched out automatically by a special switch, and when the speed is high it is switched in again, so that in the first case the battery works alone and in the second case it works in parallel with the exciter, and can also be charged from the latter while the train is running. The lighting and signalling apparatus, the battery ignition, and other auxiliary apparatus are connected up to the battery.

The operation of the controlling gear offers the same simplicity as that of a single coach after the two benzol engines have been started up and the constant exciter voltage adjusted. In the event of any part of the equipment developing a defect, the system of connections can be altered in such a manner that the train will work with the equipment of the other coach alone. This alteration is effected by means of a throw-over switch, which is sealed in its normal position. This switch is only used under exceptional conditions.

The train is also equipped with an automatic Westinghouse compressed-air brake, compressed-air sand-strewing device, and whistle.

The train was equipped by the Allgemeine Elektricitäts Gesellschaft, of Berlin (to whom we are indebted for the foregoing description), the bodies being manufactured by the Metropolitan Carriage, Wagon, and Finance Company, of Birmingham.

SPECIAL LABOUR-SAVING ATTACHMENT FOR TRAMWAY WORK ON RADIAL-ARM DRILLING MACHINES.

By A. A. Blackburn, M.I.E.E., M.I.Mech.E., and H. Vernon, A.M.I.Mech.E.,
Of the Belfast City Tramways.

In the equipment of up-to-date workshops, method and convenience are of the first importance. The accompanying illustrations show one of the latest designs of "Apollo" radial-arm drilling machines by Pollock and M'Nab, of Bredbury, Manchester, which embodies several features which we believe to be entirely novel. The machine is installed in the machine shop of the car building and repairing department of the Belfast tramways. The authors, who have had long experience in tramway rolling stock manufacture and repair, were not satisfied with the existing methods of drilling stud holes in the steel tyres of car wheels, and also the cutting of key seats in steel axles, and were of opinion that if the devices which are here described were incorporated in a modern high-speed radial drilling machine, great economy would be effected in performing the above operations. They accordingly transmitted their ideas to Pollock and M'Nab, Limited, who in conjunction with the authors produced certain alterations and additions to their machine. The working of the altered machine has been entirely satisfactory, and has resulted in a marked saving as compared with prior methods.

Radial-Arm Drilling Machines.

This type of machine, illustrated in Fig. 1, is well known and needs little description. It takes its driving power from the main line of shafting to a friction pulley on the end of a gear box (with 16 speeds

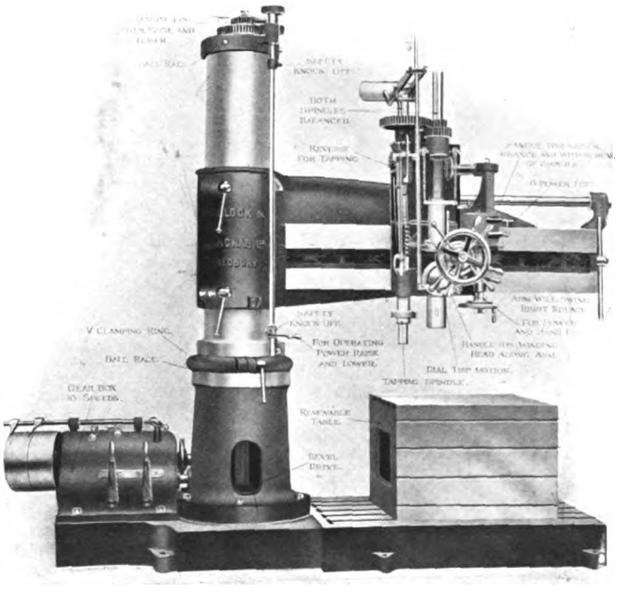

Fig. 1.

varying from 10 to 300 revolutions per minute), from gear box to a vertical shaft, up through a machine column, which is geared to another vertical shaft running down to back of radial arm. This shaft is geared by bevel pinions to a horizontal shaft running full length of machine arm. The horizontal shaft is not geared to the machine spindle the same as an ordinary radial arm machine (*i.e.*, a bevel pinion whose feather is working on a seat the full length of the shaft),

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but consists of two bevel pinions with clutch faces loose on the horizontal shaft; between these pinions is a clutch on a sliding feather actuated by a band lever. The reversing of lever causes the machine to revolve right or left hand, or throws it out of gear altogether; the idea of this will be described later. The loose pinions are both geared to another pinion keyed on a vertical shaft, the other end of which is geared to the machine spindle. There is also an arrangement for raising and lowering the arm of the machine by pinion wheels attached to a screw working in a brass nut sunk in radial arm.

The Steel Tyre Stud Drilling Fixture.

Fig. 2 illustrates a steel tyre drilling fixture which has been designed by the authors, in conjunction with the manufacturers, to take full advantage of modern high-speed steels. The metal is judiciously distributed over the machine so as to withstand the greatest strains, and to obtain the maximum steadiness under heavy cuts. It consists of a built-up cast-iron L shaped box; the vertical end is bored out to fit on machine spindle, the horizontal end containing three small hardened steel pinions. The first pinion has a short morse taper shaft fitted to it, to fit into the machine spindle. The intermediate pinion revolves in a bearing and actuates

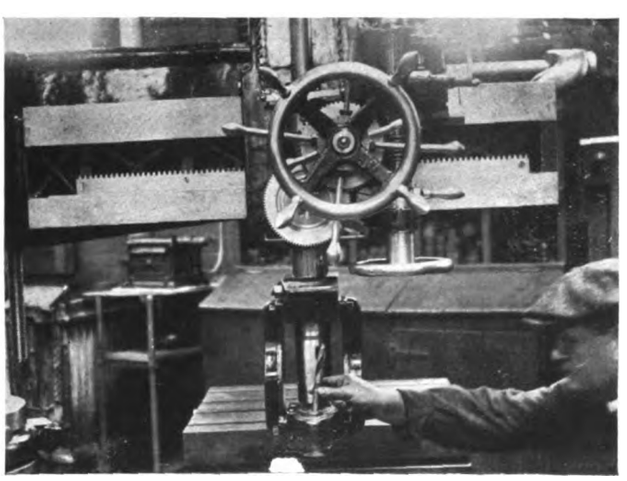

Fig. 2.

the third pinion; the centre of this pinion is tapered out to take morse twist drill. The reason for having three wheels is owing to the confined space between the spokes of the wheels, and to provide clearance between machine spindle and wheel tyres. This causes the drill to revolve left-handed, hence the idea of having the reversing lever attached to horizontal shaft on radial arm of machine. This bracket can be set at any angle to suit stud holes by means of two bolts gripping on machine spindle; these stud holes are between the spokes of the car wheels, and have to be bored upwards in a confined space. The tyres are composed of Baker's, Siemens' acid, and Brown Bayley's steel. Under the old hand-ratchet brace system it used to take from ¾ to 1 hour to drill, tap out, and stud each hole; we can now drill the same holes by the machine described in 7 minutes. We can also drill, tap out, and stud eight holes in 1½ hours, whereas the same job previously took one man 6½ hours (a saving of 5 hours on each pair of wheels).

Apparatus for Manipulating Car Wheels and Axles when Drilling Stud Holes in Tyres.

This lifting and revolving carriage (Figs. 3, 4, 5) was designed by the authors for quick handling in the above operation, and we particularly desire to emphasise that this carriage (although handling wheels, axles, and gears which weigh ¾ of a ton) can be lifted and turned quite easily by a single workman without any appreciable effort, whereas under the old conditions the manipulation of an axle and wheels necessitated the use of two men, and the overhead crane. The carriage

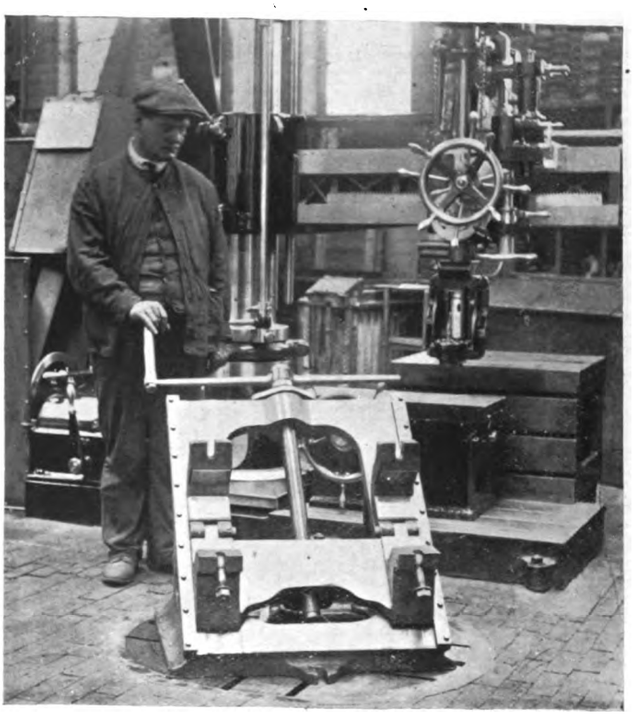

Fig 3.

is a casting, right angle triangle in shape, the angle of sliding face being 45 deg. On this face is a saddle with two hinged vee's in which the axle rests; two steel strips are bolted on to sides of casting overlapping sides of saddle, constituting guides for saddle to work in.

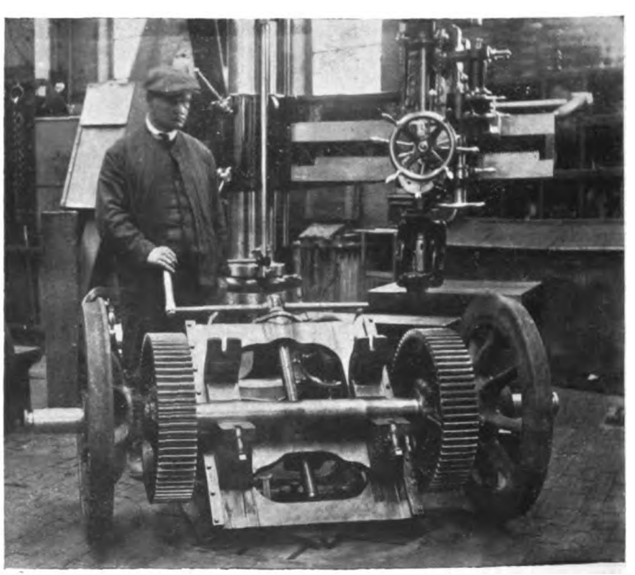

Fig. 4.

The raising and lowering method is by a square-thread screw revolving in a brass nut recessed into saddle. Let in level with the workshop floor is a circular plate casting which is provided with parallel T slots, which permit the use of two or more holding bolts and facilitate the setting of the carriage. In the centre of the carriage is a removable steel pin which acts

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as a pivot for carriage to turn on; wheels and axles can be picked up from and lowered to the floor in any position.

When the operator has drilled, tapped, and studded the four holes in one wheel tyre he slacks off two nuts,

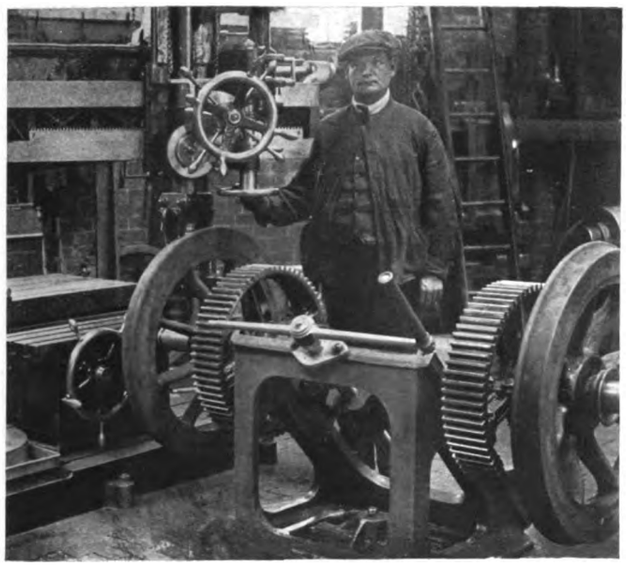

Fig. 5.

swings the carriage and axle round, tightens up again, and proceeds to drill the other wheel. The carriage casting is provided at the bottom with two slotted lugs, which allow the operator to fasten it in any desired position on the circular floor plate.

Key Seat Milling Table.

The milling apparatus consists of a table with a projecting bracket fitted to the side of it; this supporting bracket carries a 2½-in. round bar. The table is

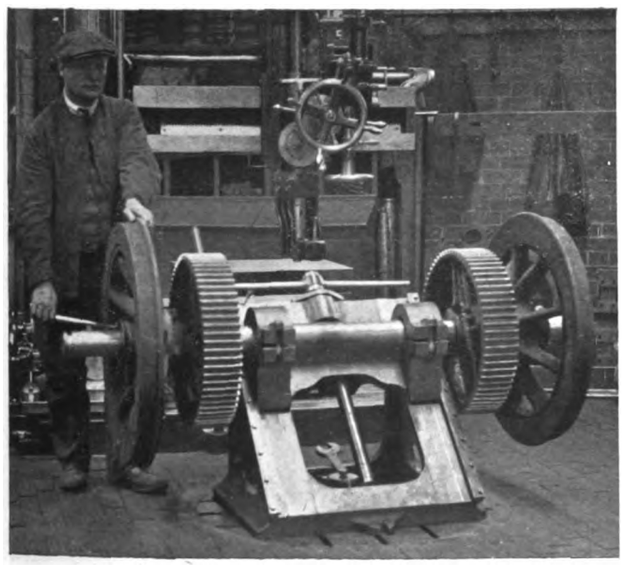

Fig. 6.

bolted to the machine bed plate, and has a sliding saddle actuated by a screw and hand wheel; on the radial arm of machine is fitted a portable saddle with a projecting arm, which takes in the other end of round bar; means are provided whereby the steadying bar can be nipped up tight.

Axles are fastened to the table, and the key way cutting and slotting attachment (Fig. 7), consisting of two cast-iron half laps of heavy design bored out to fit axle held together with two ¾ in. bolts, a space of $\frac{3}{32}$ in. being left behind faces of half laps to secure a good grip on axle. Let into half top is a hardened cast-steel centre piece in which is a slot of exact dimensions of key seats to be cut in axle. This attachment is clamped on the axle where key seat has to be milled (position of key seat being marked on axle previous to this), the machine spindle being lifted up and down to make sure that milling tool is in line with slot in attachment.

This is an extremely simple and effective arrangement, which will be appreciated by the practical workman. The usual four-wing milling tool is used; this tool is guided in the special slotted bracket in which is fitted the hardened steel key seat guide, this arrangement having the double advantage of being far more rigid

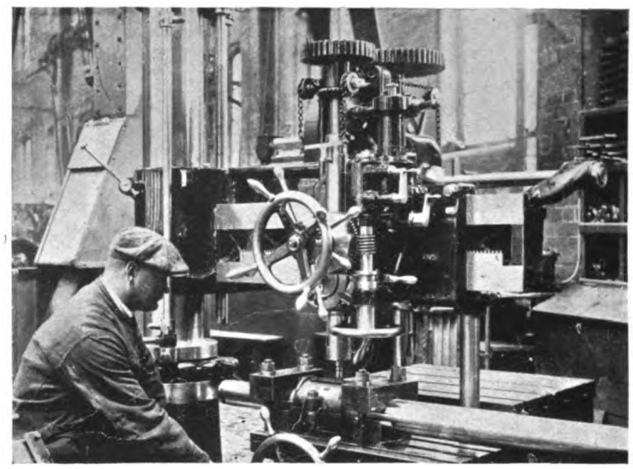

Fig. 7.

than the ordinary type of slender overhanging tool; also the slot guide acts as an efficient stop and template for the workmen to go by. With this arrangement we can mill out to a standard size, key seats 5 in. by 1 in. in 30 minutes.

In conclusion, we wish to state that the machine described is manipulated entirely by one workman; he can roll into position wheels and axles, lift them off the ground to any desired height, secure them, drill, tap, and stud the tyres, turn them round and finish the other tyre, and lower to ground again. This is a great saving in labour, and it is effected by what is virtually a one-man machine.

OBSTACLES TO LIGHT RAILWAYS.

£750,000 of a Treasury Grant Awaiting Claimants.

At a sitting on January 15 of the Royal Commission appointed to inquire into the relationship between the railway companies of Great Britain and the State in matters other than safety of working and conditions of employment, one of the witnesses was Mr. H. A. Stewart, one of the Light Railway Commissioners, who described the procedure for obtaining light railway orders. He also mentioned that the distinction between a light railway and a tramway had never been defined. In a recent rating case in the House of Lords the point was not decided, although reference was made to it. The witness also spoke of the cheapened procedure under the Light Railways Act as compared with a Parlimentary inquiry. The main reason why many authorised light railways had not been constructed was that the promoters could not raise the capital. A sum of one million pounds was set aside by the Treasury at the passing of the Light Railways Act in 1896 for helping the construction of light railways, but three-quarters of that sum still remained in the hands of the Treasury. The return on capital expended by light railway companies had been very small, and therefore construction of additional lines had been discouraged. If such railways were to be made to any extent it would be necessary to do it with money which had public credit behind it. If public money was to be used it would be well to have some form of public control, both as to construction and working.

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THE
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Inequity of Road Maintenance Charges.

An unprecedented situation has arisen in Cambridge owing to the action of the Town Council. The greatest injustice has been wilfully done to the Cambridge Street Tramways Company, and apart from that the position is one of the strongest possible arguments for Parliament making no delay in passing the legislation which has been suggested in so many quarters for obliging the owners of motor omnibuses to contribute a fair share to the maintenance of the roads on which they run. The circumstances are really extraordinary. On a petition by the Corporation, Mr. Justice Astbury, in the Chancery Division of the High Court on February 3, made an order for the compulsory winding up of the tramway company. That came about in this way. The company were originally under the usual obligation to maintain the part of the street surface occupied by the tramway tracks. In the year 1892, however, the Corporation agreed to take over this liability on condition that the company should pay £325 a year. The payments were made for 20 years, till in 1912 the company could not pay because they were suffering much from motor omnibus competition. The company's lines are worked by horse traction, and the Corporation have not only granted licences for the running of omnibuses but have refused permission to the tramway company to adopt electric traction. Thus the Town Council were the means of introducing the competition, and they were also the means of preventing the company from taking steps to meet it. Moreover, the omnibuses pay nothing for the use of the streets, and the tramway company is to be wound up because it cannot pay for street maintenance, the need for which is greatly increased by the running of the omnibuses. Were it not for the injustice, the situation might be regarded as Gilbertian. The Town Council have not only slain the goose which laid the golden eggs, but they have brought on the scene another goose the cost of whose food (in the shape of street maintenance) they will speedily realise. It was contended in Court on behalf of the tramway company that the petition should not be granted until Parliament had dealt with the general question of making omnibuses pay for road maintenance. The judge, however, pointed out that he could not very well keep the petition hanging about until Parliament made up its mind as to the respective proportions of highway upkeep to be borne by tramways and omnibuses. Nor could he see that the difficulties of the company were only temporary, for the sum due to the Corporation was steadily mounting up. As to the Corporation refusing sanction to electrification of the tramways, that was a matter for the electors of Cambridge. So the winding-up order was made. What the judge said was perfectly true, and no adverse criticism can be passed on his opinion. The fault from first to last has been with the Corporation. Presumably they are incorrigible in the matter. It now lies with all concerned to stir up Parliament to get omnibuses and tramcars put on an equitable basis as regards contributions to road maintenance. The need for and justice of such a change is admitted, but in these days of political strife it will not be brought about unless energetic influence is brought to bear. The matter brooks no delay, as the use of omnibuses and other heavy road-destroying motor vehicles is growing all over the country. The road authorities are calling on the Road Board for financial help and they are getting a little, but obviously such aid is an inadequate and temporary make-shift.

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South Western Electrification.

The London and South Western Railway Company are to be congratulated on the activity which is being shown by their engineers and contractors in pushing on the work for the electrification of the company's suburban lines. The equipping of these routes, which began at the end of October last, is steadily advancing. Even the casual passenger cannot fail to notice that over a considerable distance the high-tension cables are already mounted on brackets attached to short posts along the side of the railway. The laying of the conductor rail and the bonding of the track rails will be speedily carried out. It is a matter for some surprise that a fourth rail is not to be used for the return current so as to make the system uniform with that of the Metropolitan District Railway. Meantime, at all events, the track rails are to be used for the return. A great deal of work has been necessary in constructing the foundations for the power-station near Wimbledon. Excavations were begun in July last, and things are now so far advanced that the erection of the superstructure will be commenced shortly. The construction of the great power generating units, which is in the hands of Messrs. Dick, Kerr and Company, is well advanced at their Preston works. When the station is completed there will be six of these units, consisting of steam turbines coupled to 5,000-KW. three-phase alternators producing current at a pressure of 11,000 volts. The various sub-stations will be pushed forward rapidly, and it is hoped that before long the suburban districts served by the South Western Railway will have train services of a frequency and speed such as they have never experienced before.

Traction Schemes in Parliament.

The programme of Private Bill Committee work for the session of Parliament which began on February 10, so far as it concerns tramways, railless traction, and motor omnibus schemes, promises to be of considerable interest. The number of applications of the kind is about 30, as compared with 36 a year ago. There are only two important tramway proposals, those of Birmingham and Glasgow Corporations, each of which seeks authority to construct about 20 miles of new lines. These are cases in which large city systems are being pushed further out into the surrounding country. The case of Glasgow in particular is striking, because some of the proposed lines will, if constructed, link up the city and its suburbs with towns at some distance away which are separated from the city by open country. Another interesting feature is the proposal by Bristol Corporation to take powers to acquire the tramway undertaking of the Bristol Tramways and Carriage Company. Bristol is one of the few great cities of the country which does not at present work its tramway system, but at all events it has been excellently served by the company, and if the purchase does take place it will be by agreement, and not under the servile conditions of the Tramways Act. The London County Council tramway proposals are this year very small by comparison, but on the other hand there is some prospect that the consents of the road authorities will be obtained, so that the fiasco of some recent years may be avoided. The very wide powers asked by the London United Tramways Company in regard to leasing and working point to efforts being made for mutual arrangements between different companies and schemes for interchange of traffic, which ought to be of much advantage. The bulk of the other tramway proposals are simply for small or moderate extensions by local authorities of their existing systems. An effort is being made by the City of Oxford Electric Tramways Company to come to a statutory arrangement with the Corporation as to abolishing the existing horse tramways and running motor omnibuses instead. The only scheme of importance in connection with London underground electric railways is a bill promoted by the Metropolitan and Great Northern Railway Companies, which seeks to constitute a joint committee to construct the authorised extension of the Great Northern and City line to the Bank of England, and also lines forming a junction between the Great Northern and City line at Moorgate Street and the Inner Circle Railway near Aldgate, together with a further extension of the Great Northern and City from the Bank to a junction with the Waterloo and City Railway terminus. Probably the most remarkable feature of the bills is the fact that no fewer than eighteen out of the total seek powers to run motor omnibuses. Practically all

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these bills are promoted by local authorities, and in some cases by Councils in whose districts there are no tramway systems. The number of proposals to erect poles and wires and to use them for working vehicles on the trackless trolley system is eight, two of which are promoted by companies and the rest by local authorities.

British Electrical Manufacturers' Association.

It is gratifying to observe that the impression that the British Electrical and Allied Manufacturers' Association is doing excellent work and is steadily growing in influence is fully and clearly borne out by the report for 1913 of the Council of the Association. Though it is some eight years since the Association was incorporated, it has only had two years of working under its new constitution. During these two years the Association has, however, been very active, and during 1913 its position has been established beyond question. The membership has again substantially increased, and keen activity has been shown by the various committees in carrying on their work. The important subject of standardising general conditions of contract as between manufacturer and purchaser of heavy plant is still under negotiation with the Institution of Electrical Engineers. Conditions of sale to govern smaller transactions have been circulated, and the excellent system of cross-tendering agreements has won further adherents. Probably there is no more important branch of the Association's activities than the work of co-operating with the Engineering Standards Committee in adjusting standards for machinery and appliances. Co-operation is also going on with the Standardisation Committee of the United States for the preparation of new international rules. Among other activities the most prominent has been the carrying out of a scheme whereby the new University at Hong-Kong has been supplied by the Association with a complete electrical laboratory. It is hoped that Chinese electrical students being accustomed to the use of British-made apparatus will lead to increasing demand in China for the electrical machinery and appliances made in this country. At the annual dinner of the Association on January 21, a good deal was said of the importance of fostering British electrical trade for the benefit of the British community and of the Empire. Much may be done, and in fact is being done by the Association in this direction, so that system is taking the place of lack of system, but the members, like all other manufacturers, are still faced with the trouble of competition by foreigners, who, on their part, are not subject in their own countries to any competition from abroad, as they are hedged round by protective tariffs which do not exist in this country.

Philadelphia's Transport Inquiry.

We have received two large volumes, containing the report of the Transit Commissioner of the City of Philadelphia, Mr. A. Merrett Taylor, which was presented to the City Council of Philadelphia on July 24, last year. The first volume contains the text of the report, which, with numerous statistical tables and appendices, comprises 267 quarto pages. Volume II. contains 69 elaborate maps and plans. Many of these maps give a comparison of passenger transport facilities in Philadelphia, New York, Chicago, and Boston; others show the development of time-saving by rapid transport, and various phases of the traffic problem in Philadelphia. The lines recommended for construction either immediately or in the future, with plans and sections, and time distance diagrams, conclude the series. All these maps measure 17 in. by 21 in., and are reproduced with great clearness, colours being used where required. The greatest care has evidently been taken in their reproduction, and they contain a vast amount of information to collect which it is evident that neither time nor money has been spared. Altogether the report is one of the most elaborate documents that has ever been presented to any Corporation engaged in the study of their local traffic problem. To enable the Council to make adequate comparisons, the plans of the rapid transit systems of various cities, including New York, Boston, Chicago, etc., have in many cases been superimposed on the map of Philadelphia, time zones being also shown, so that the relative convenience of transportation in Philadelphia as compared with other cities can been seen. We venture to congratulate the City Council of Philadelphia and its Commissioner on the thorough way in which the problem has been investigated, and

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the care with which the details have evidently been worked out. It is, of course, impossible to form an estimate of the recommendations made, but it is clear that the preliminary investigation has been carried out with great ability and with scientific thoroughness. In this country, where many of our cities are feeling the pressure of growing population and inadequate transport facilities, the study of these volumes by responsible officials can hardly fail to be of value.

NEW FORM OF RAILWAY ACCOUNTS.

All those interested in transportation, including not only railway officials, but tramway managers, engineers, and accountants, will find much interesting and important information in the reports of the railway companies of this country for the last year. As everybody knows, the Railway Companies (Accounts and Returns) Act, which was passed in 1911, provided for the accounts of railway companies being published in a much more extended and explicit form than hitherto, and also for the publication along with them of elaborate statistical returns. The hitherto existing forms prescribed by section 9 of the Regulation of Railways Act, 1871, were superseded, and so was the obligation to issue half-yearly accounts, the interval now prescribed being one year. As the Act of 1911 did not come into operation till the beginning of last year, the annual detailed accounts now published for the year 1913 are the first of their kind, and very interesting is much of the information. It is not our intention to set out here the main new requirements, but certain features which are of special interest to those concerned in light railway and tramway undertakings. Briefly, however, it may be said that there are now no fewer than 10 forms under capital account, 20 under revenue account, and a general balance sheet. The statistical returns are 24 in number. Almost every detail of importance is provided for, except ton-mile and passenger-mile statistics, which at the time the subject was considered by Parliament were ruled out as involving too much complication and labour. One very interesting feature is that both as regards capital and revenue and expenses, separate information is given of all subsidiary operations of railway companies, such as steamboats, canals, harbours, electric power-stations, hotels, and land not forming part of the railway or stations. Particulars as to rolling stock, mileage, joint ownership, running powers, and so forth are elaborated.

The information given in the accounts of British tramway companies is often less detailed even than was that of railway companies under the Act of 1871. But the admirable system of tramway accounts formulated some years ago by the Municipal Tramways Association, and generally adopted by municipalities working tramways, leaves little or nothing to be desired so far as such undertakings are concerned. It will strike any municipal tramway officer surveying a sample of the new railway accounts that, making allowance for the differences in the nature of the two classes of undertakings, there is a wonderful similarity between the new railway form and the municipal tramway form. Of course, the details as to the railways are much more voluminous owing to the varied nature of the traffic carried on, passenger, goods, and mineral traffic, as well as empty train running and shunting, all having to be provided for. Perhaps the most marked difference, however, is that no attempt is made to work out receipts and expenses per train-mile run. If this were worked out over all, it would, however, be of little use, in view of the great variation in weights and speeds of trains and of the mileage run in shunting. There is, however, an elaborate table of engine mileage. Taking the new accounts and returns over all, one may on a comparison congratulate the Municipal Tramways Association on their skill and prescience, because their form for tramways appears to do all that the new railway form does for railways.

We may now turn to the parts of the new accounts and returns which relate to electric traction on railways and to road services. This is a matter in which tramway men will take much interest, and electrical engineers in particular will be greatly concerned. Hitherto, in the case of British railways working part of their lines electrically, practically no information as to the financial results obtained from the electrical operation has ever been made public. Only in the case of the few companies whose whole systems are electrical has information been available. Now, however, the veil is to some extent withdrawn, and as years go on and comparative figures become available, the results will be of increasing interest. In the first place the new capital accounts must show separately the expenditure on electric power-stations. These, of course, supply lighting as well as traction, and it would be desirable to separate the two items as far as possible. This may be done, because section 3 of the Act gives power to the Board of Trade to alter or add to the first schedule, and the first schedule is that which prescribes the forms of accounts.

In the abstracts giving details of working expenses, Abstract C, dealing with locomotive running expenses, requires particulars separately for electric train working under the headings of wages of motormen, electric current, lubricants, and other stores, including clothing. Account No. 11 calls for details of receipts and expenditure in respect of omnibuses and other passenger vehicles not running on the railway. Account No. 17, relating to electric power and light, specifies expenses under the general heads of superintendence, generation, and distribution, and to these there are several sub-heads. On the receipts side are given the number of units supplied and the revenue therefrom stated separately for traction, power, lighting, and other consumers.

Among the statistical returns which follow the accounts, Return No. 2, dealing with rolling stock, has a sub-head B, which deals with rail motor vehicles. Provision is made for stating separately the number and carrying capacity of vehicles moved by steam power, petrol power, and other power (self-contained). Sub-head C provides for a statement of the number of trains worked by electric power and their carrying capacity. In return No. 3 are given the numbers of horses and road vehicles employed in the collection and delivery of parcels, goods, and passengers. The goods and parcel road vehicles are divided into road motors for goods and parcels, horse wagons and carts, and miscellaneous. The passenger road vehicles are divided into road motors, tramcars, omnibuses, cabs, and miscellaneous. In Return No. 11, among other things to be stated is the number of rail motor and electric vehicles renewed during the year in the company's workshops and (separately) by contract.

There is thus a good deal of information available, but from the nature of the case, owing to the difficulty or impossibility of allocating properly all receipts and expenses, the conclusions as to electric railway and road traction will still be somewhat indefinite. Still the light will be great, as compared with the darkness existing hitherto, and it will spread as more steam railways are electrified.

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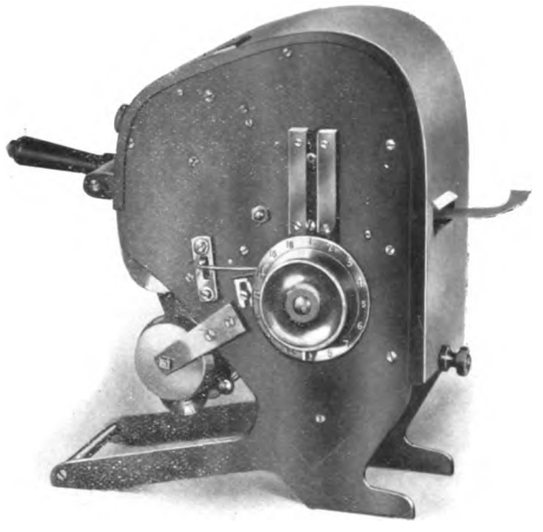
P-A-Y-E AUTOMATIC TICKET MACHINE.

The International P-A-Y-E Tramcar Company, Limited, have now completed a model of an automatic ticket issuing and registering machine, to be used with the pay-as-you-enter system of platform fare collection. The machine registers automatically the number of the tickets sold and imprints on the ticket the destination of the passenger for the value of the fare paid from the point at which the ticket is issued. The operation of the machine is quite simple and the delivery of the ticket very rapid; in fact the tickets could be issued from this machine at the rate of 200 per minute, which is greatly in excess of the possible number of passengers that could board the car in this time.

The machine is mounted on the barrier which forms the conductor's station and is equipped with a handle, the operation of which delivers the ticket to the passenger as he passes the conductor, so that it is not necessary for the conductor to pick up and hand the ticket to the



P-A-Y-E Automatic Ticket Machine.

passenger, the passenger taking the ticket from the spout of the machine as it comes out. This enables the conductor to have both hands free to execute his manifold duties, such as giving change, etc., inasmuch as the time required to operate the handle for the delivering of the ticket is but the fraction of a second.

The machine gives an audible bell signal for each ticket issued, and is so constructed that it is impossible for the conductor to procure a ticket from the machine without ringing the bell and recording the same, and it is furthermore impossible for him to insert a used ticket back into the machine—thus the possibility of fraud is eliminated.

Any number of fare stages, up to 100, can be provided for with this machine, and whether they are regular or irregular in the overlapping does not affect the machine. As previously stated, the ticket is issued with the destination clearly marked upon it.

The method of indicating the destinations can be either the name of the point or street at which the fare expires, or the number, such as is used by the London County Council, indicating the same: further, both the name and number may be used if required, the number serving as a ready indicator to the conductor, and the printed name being for the guidance of the passenger and to dispense with the placards of fare stages and corresponding numbers at present displayed in the car.

The accompanying diagram, Fig. 1, shows a route of 16 points and 16 fare stages, in which the overlapping is constant and regular throughout

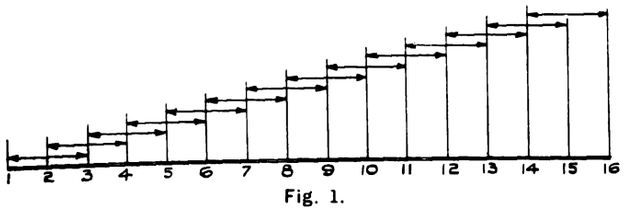


Fig. 1.

the route, there being an overlapping of one point in each stage. Consequently, starting at the terminal point, number 1, the first fare, expires at point 3, and the indicator is set accordingly to impress number 3 as the destination. The indicator is not moved, as all tickets issued between points 1 and 2 are available to point 3. Arriving at point 2, the conductor sets the indicator to point 4, which is the destination of the next fare from this point; arriving at point number 3 he sets the indicator to point 5; arriving at point 4 he sets the indicator to point 6, and so on, until eventually he reaches point 14, where he sets the indicator for the last time to point 16, and it remains in this position until the completion of the journey.

Now let us consider the second diagram, Fig. 2. This is a similar route, wherein the overlaps are constant and regular throughout the

Fig. 2.

route, except that here we have an overlapping of two points. Consequently, beginning at the terminal point No. 1, the indicator is set to No. 4 as the destination of the first fare, and remains in that position until point 2 is reached, when the indicator is set to point 5: arriving at point 3 the indicator is set to point 6; arriving at point 4 the indicator is set at point 7, and so on, until point 13 is reached, when the indicator is set to point 16, and remains in this position until the completion of the journey.

Now to make clear the application where the stages are not regular or proportional, we refer to Fig. 3, in which there are 16 points at

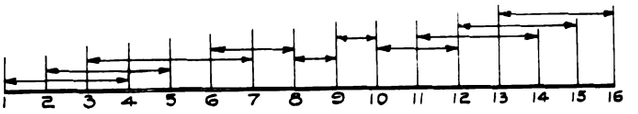


Fig. 3.

which fares begin or terminate. Starting at No. 1, the first fare is available to point 4, and the indicator is consequently set for this destination. Arriving at point 2, the destination is No. 5, and the machine is set again; arriving at point 3, we have 4 points for the fare instead of 3, the destination is accordingly set at point 7, where this fare expires. At point 5 no fare begins, consequently the indicator is not set at this point. Arriving at point 6 there is another fare of 2 points, the indicator is set here at 8. At No. 7, as there is no fare picked up, the indicator is left alone. Arriving at point 8, a fare commences which does not overlap, and expires at point 9, so that the indicator is set at point 9, at point 9 there is another fare which does not overlap, and the indicator is set at point 10. From here onwards the fares overlap, as shown on the diagram, the indicator being set each time accordingly as before described. The capacity of this machine provides for 100 of these points, and by the simple setting of the indicator at the beginning of each fare stage the tickets are delivered with the corresponding number of the destination, for identification when the ticket is deposited in the box as the passenger leaves the vehicle.

Now having described the operation of the machine for one fare value, the same applies to the other values, a separate machine being used for each value; it will not be necessary however to have machines for the higher values, which values form a very small proportion of the tickets issued by the conductor. These are held in a holder and issued in the ordinary manner when required, each ticket bearing a plain characteristic to indicate the destination. If desired, however, machines for these values could be used.

Thus it will be seen from the above description that the main object has been obtained, that is to say, the instantaneous delivery of those tickets most frequently used. With the assistance of the change holder, the conductor is enabled to issue tickets and give change faster than the passengers are able to board the car.

The machine greatly simplifies the work of the conductor in regard to the waybill and the issuing of tickets. It is no longer necessary for him to select a ticket of a certain value and then select a particular place in this ticket and punch it, which requires calculation as to the present position of his vehicle and the destination of the fare for that value. With the P-A-Y-E machine, he simply operates the handle of the value required, and the ticket is automatically imprinted with the destination and delivered to the passenger. Conductors will appreciate this saving of both mental and physical energy.

In regard to the office staff, the work here is again reduced, as the register only requires to be checked with the man's waybill for each value of tickets sold. The work of book-keeping is simplified, as the different value tickets are separately recorded and the numbers consecutive, so that the numbers can be entered from day to day. The machine is quite small, occupying a space 8 in. by 3 in. by 6 in. As shown in the illustration, it is equipped with a temporary base, or stand, for demonstrating purposes. In service a clamp attachment is substituted for fastening the machine to the barrier which forms the conductor's station, and is so arranged that the machine can be quickly removed. In our illustration the machine is shown with the casing, which covers the bell and reel of tickets, removed.

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THE USE OF METERS ON TRAMCARS.*

By M. Delthil

(Chief Traction Engineer of the Paris General Tramways Company).

The use of meters on tramway cars attracted the attention of French technicians only to a small extent before 1908. From 1901, however, certain German companies had endeavoured in this way to reduce the consumption of energy, over which they had previously thought that they could exercise no control except by supervision and instruction of the motormen. The first experiments were made with time meters, and if they failed, it was because such apparatus gives only an inexact measure of the real merit of the motorman—that is to say, of his efforts to reduce the consumption of energy without injury to the rolling stock. The new factor in 1908 was the appearance upon the market of a French meter, that while possessing the regularity and solidity of construction which produced in part the success of the time meter in Germany, registered the consumption of energy in a way which served better as a basis for the classification of motormen.

Among the companies which attempted the use of these meters in 1908 upon an extended scale, we ought to mention first the Eastern Tramways Company of Paris. M. Bouton, manager of these tramways, read a paper in favour of ampere-hour meters in 1910 at the International Tramways Congress at Brussels, in the presence of an audience of which the majority used hour and watt-hour meters. We shall see later in this paper that he was fully justified by events.

The tramways company of Bordeaux entered boldly some months later on the same course. Then came the Paris General Tramways Company (1910-1911), the tramways of Nice and of the Littoral (1911), those of Caen, of Cherbourg, and of Rouen (1911), the Nogent Railway (1912), and the Angers Tramways (1913). Among the installations in progress may be mentioned those of the Marseilles Tramways, which made its first experiment long ago, and finally the General Omnibus Company. Many other French companies now use meters, but it has not been possible to obtain their opinions on the question. The reports made by eleven companies form, however, important evidence, which is the more significant because they include undertakings of very different extent, ranging from the Paris General Omnibus Company which has in service about 700 tramway motor cars, to the Cherbourg Tramways which have only 10.

Number of Cars Equipped with Meters.

The most important companies, as far as the number of cars actually equipped is concerned, which have supplied information to us, are the East Parisian and the Paris General Tramway Company. The former, since October, 1909, has equipped 287 cars with meters; the latter, since March, 1911, 286 cars. The Paris General Omnibus Company, although it has as yet equipped few cars, proposes to apply meters to its 700 cars. The Marseilles Tramways completed the equipment of all their cars, 430 in number, in June, 1913. The Bordeaux Tramways in 1910, completed the equipment of their 224 cars. Then comes in order of importance the tramways of Nice and the Littoral (158 cars equipped since July, 1911); the Rouen Tramways (155 cars since August, 1911); and the Nogent Railway (109 cars since November, 1912).

As an example of systems of small or average extent we may take those belonging to the company "Les Exploitations Electriques," which show the value that the use of meters has for undertakings where one would believe that *a priori* the supervision of the motormen would be easy, and consequently that careless driving would be less common. Of the three undertakings of this company, that of Angers, in course of equipment, has 32 cars, that of Caen 17, and that of Cherbourg 10, both completely equipped, the former since June, 1911, the latter since March, 1912. By adding to this list other applications which we know have been made, undertaken, or projected by companies, which for certain special reasons have not responded to our enquiry, we reach a total of 3,000 meters. Keeping in mind that the first attempts undertaken in France on an industrial scale go back to 1908-1909 it may be concluded from what has been said above that the meters have in five years become a practical feature of electric tramway undertakings in France. In our opinion only a few years will elapse before they extend to many other undertakings which for various reasons have not yet employed them.

Type of Meters.

All the meters in use on French tramways are ampere-hour meters. More simple than the watt-hour meters, because they do not include any high-tension circuit, they are for the same reason less exposed to electrical injury. The revolving disc intended to effect by the production of Foulcault currents the twisting movement of the watt-hour meters is a cause of mechanical injury, owing to the small depth of the air space. This cause of injury is absent in the ampere-hour meter. Finally, the ampere-hour meters register the merit of the motormen just as exactly as the watt-hour meters, provided that the motormen work under the same conditions and with the same potential.

It is now recognised as a fact, because it has been verified in all undertakings which have used the time meter, that the function registered by this apparatus, the time during which current is used, gives a very inexact measure of the merit of the motormen from the point of view of the economical use of energy. Mounted on the same cars it tends to place the motormen in an order quite the opposite of that which electric meters would give. This opinion of time meters is confirmed by the tramway companies of Marseilles and of Bordeaux, which have rejected them after trial.

If the question is looked at from an international point of view, two types of ampere-hour meters present themselves. One, the Mercury meter, which is to be found in different forms originating from the Ferranti meter, is widely used in England and on some systems in Belgium. The other, the O.K. meter, is the only type used in France, with one exception, that of 50 Mercury meters used by the South of Paris Tramway Company. The O.K. meter is also used on several undertakings in Switzerland. The success which the O.K. meter has met in France is due, in our opinion, not to any question of nationality, but to its intrinsic merit. The companies which have replied to our question are unanimous in their praise of its behaviour in service.

If the advantage of simplicity is at first sight in favour of the meters based on the principle of the Barlow wheel, the behaviour in service of the meter with a wound armature, its accuracy, and its resistance to vibrations, make it a practically superior machine. None of our correspondents, moreover, give us any instances of injury due to the construction, either of the armature or of the commutator.

Records Kept.

The principal item in the records kept of the use of meters is a sheet which accompanies each car. On this sheet the motorman who is going off duty, checked by the relieving motorman, writes down at the moment of his relief the reading of the meter and the necessary details to show the number of kilometres run. Sometimes this sheet is specially printed, and is sent at the end of the day to the responsible agent. Sometimes the readings of the meter are written in a special division of the "car sheet," on which the motormen are required to record the log of their car.

The companies have tried to design an arrangement of the sheet which renders the recording of the car mileage as easy and as detailed as possible. The process used by the Bordeaux Tramways consists in placing on each sheet a table containing numbers from one to the number designating the highest number of trips. If the motorman has not crossed off any figure the trips whose numbers are written down in the margin are concluded to have been accomplished one by one. If the number corresponding to a trip is crossed off, it is because the service has been incomplete. The agent then finds in another division of the sheet the indication of the irregularity which took place. The same method is used to record a distance traversed by the trail cars, but the numbers crossed off are those of the trips run.

The larger number of the other companies have the report written down in a graphical form, either by dots indicating the arrivals at the terminus, or by a curved line, distinguishing between the outward and the inward trips. In this case the run accomplished with a trail car or with a disabled car, either pulled or pushed, is shown by the kind of line used. We have found that this graphical method, which we have used since the commencement of the use of meters on our system (Paris General Tramways), is after a few days thoroughly understood by the motormen, and permits rapid inspection of the sheets.

A duty which the Paris General Tramway Company alone requires of its motormen, consists in requiring the motormen to record the readings of the meter, not only at each relief, but also at every arrival at a terminus. After having feared that the carrying out of this duty would make the service more difficult, we have proved that motormen who desire to obtain the bonuses note the consumption of their own accord, and write it down in a book after each ordinary run. It was, therefore, not asking too much of them to require them to write down the reading once in every two runs. By imposing this additional work we thought we would render frauds more difficult. We will show later on that our intention has been fulfilled.

All the companies have the readings written down or verified upon the departure and the return by senior inspectors. It is indeed necessary to take this precaution against falsified readings in those cases where the interests of the two motormen are not the same, and do not, therefore, constitute a guarantee of correctness. It would even be prudent, in our opinion, to have it checked by the inspector at the relief points, when one of the motormen is a disinterested person, who, on account of his special situation, might agree to an alteration of the figure by his colleague. The deceptions which are described to us in the replies to our questions are indicated as few in number. They consist in misreading the meter or in attempts to short circuit it. They allude also to the tendency which certain motormen have of reducing the speed of their car in order to reduce the consumption. Finally, one company has informed us of intentional mistakes in the reports of trips in which the full required distance was not run. We have ourselves experienced all these troubles, but after the application of

* From a report presented to the first General Technical Assembly of the Tramways and Light Railways Union of France, and specially translated for The Tramway and Railway World from the *L'Industrie des Tramways*.

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a few severe penalties, attended with considerable publicity, an improvement has been made which we think will be lasting. The technical frauds, which are the most interesting, were produced on certain cars in which protection of the shunt and of the wires of the meter was least complete. The motorman on his return to the depot short circuited the meter by means of a needle. The fraud would have been discovered afterwards by the responsible agent if the motorman had not at the same time altered the previous readings taken earlier. But the delinquents had understood that in such a case it would be necessary, upon re-entering the depot, to make a fictitious record of the readings through all the runs made since he took over the car, averaging the different trips so as to make them seem correct. Certain clues had put us on the track of these misdemeanours when a motorman gave himself away. Wishing on a return to the depot to short circuit the wires of the meter, he put together the wires of the lighting circuit, as a result of which clumsiness he had his fingers rather seriously burnt.

From that day we have required the motormen to record their daily readings trip by trip. The evidence given by an inspector or by a supervising motorman that the readings have been left in arrears carries with it the supposition of a fraud. It will be seen from this example that the obligation under which we place our motormen to register the readings after every trip helps us very effectively to discover fraudulent manœuvres, either by detecting the motormen who make clumsy, fictitious readings, or who propose to alter their readings by leaving the figures blank. We will add in a general way that the readings by the trips allow a practised inspector, to whom the average consumption per trip has become a familiar figure, to recognise all irregularities whether or not they have a fraudulent character.

It is essential to the proper use of meters for the distribution of bonuses based upon the consumption of energy, that all the motormen who develop the same amount of intelligence and of application, should have the same chances of obtaining similar bonuses. This becomes easy when a line employs a sufficiently large number of motormen to arrange a classification based on such conditions that the work of the motormen over the period of a month is equalised. But this is only rarely realised. It may be that the line has termini in the middle, and that the consumption per car-kilometre must be considerably different on different sections of the line, or that the line is worked by cars or trains of different types; or again, that the rotation of the motormen is too slow, or even that the motormen do not work in rotation. It is possible to even up these inequalities, but it is difficult to remove them entirely. Those caused by rotation could be diminished by increasing the month to a period of three months as the period of time after which the classification takes place. Those which spring from the differences of the line and trains should be corrected by the application of experimental co-efficients. The most correct co-efficient would be the relations between the average consumptions per car-kilometre during the month on the various sections, or by the various cars. Finally, it might be necessary to divide the motormen into as many groups as would be required to give them all the same chances of success.

Rewards and Penalties.

All the companies whose replies we have received agree in granting a pecuniary reward based upon the classification of the motormen. Some of them employ, in addition, without any settled rule, and as opportunity occurs, encouragements of another kind; for example, promotion to the rank of inspector motormen. It goes without saying that the inspectors charged with the practical instruction of the young motormen would be chosen from the head of the list. Some companies also make use of penalties in the case of motormen who pay the least attention to, or are the least successful in limiting their consumption of energy. These penalties extend from a reprimand to a discharge. One company applies as a penalty to bad motormen a return to the instruction stage.

The pecuniary advantages reserved for the best class could be arranged under three heads:

The first method is to determine for one group of motormen working under the same conditions that amount of energy which they should find sufficient. If a motorman's average consumption is inferior to the stated average he receives a part of the profits proportional to the difference between his record and the stated average.

The second method is to take as a basis of comparison for each classification, either the consumption of the motorman who occupies a certain rank, or the average consumption of the motormen within given limits. All the motormen whose consumption of energy is less than the consumption thus defined receive a bonus. This bonus is proportional to the distance between the two figures. The total amount to be distributed is determined by the undertaking; it may be fixed or it may be a percentage of the gross saving.

The third method consists in attaching to each rank of the classification a definite bonus. If 50 motormen are working for the bonuses, three-fifths, or 30, for example, might receive bonuses. Out of these 30, the first three would receive 15, the three following 12, the next six 10 francs, and so on. In this system the number and amount of the rewards are fixed in all classes, so that the company knows beforehand how much it will have to expend.

In electric traction the rolling stock is of similar type, and the practice of rotation makes the conditions of work more or less identical. It is thus possible for the motormen to compete with one another for the bonuses. The first method is less convenient, since it implies a previous determination for each line and for each kind of car of an experimental figure, a figure which is not settled, but variable according to the atmospheric conditions, and which requires also to be rectified each time that an alteration or any improvement is made in the rolling stock. It must be added if the stipulated figures are determined in a hasty manner, the undertaking is apt to give unduly large bonuses. It is for these reasons that we attribute the present discredit of this system, in spite of the more mathematical character which at first sight speaks in its favour. Of the 11 companies which have replied to our questions, there is only one which makes use of this method, and another which is preparing to do so.

The second method, that is to say the rewarding of a certain proportion of the total number, is employed by five other companies. This system, which can be put into action without any previous experiments, is suitable to all lines, to all types of rolling stock, and appears to us to be very sensible. The total amount to be distributed may be a sum fixed beforehand, but more often it is a given fraction of the gross saving from the use of meters. In the latter case, one would do well to fix first of all a small fraction, and be able to raise it later.

The third way is employed by four companies. At the commencement we applied this system to our undertaking experimentally with the intention of obtaining a first drop in the consumption of energy. The results obtained have been so satisfactory that the company has extended the award of definite bonuses to the whole of its motormen, and has thus retained as a lasting institution a system which at first had been regarded as temporary only. This system removes all possibility of fraud, for it is very simple and, an important point in our opinion, it is understood by all the motormen. We ought, nevertheless, to note that one company which distributes variable bonuses considers it an advantage to keep the motormen in ignorance of the manner of distribution.

In most cases the number of working days is taken into consideration. The motormen showing results below the fixed minimum may be ruled out of the competition. One company takes into account the results of the inspectors' reports.

We note as an interesting point, especially for small systems, the institution in provincial undertakings of three months' bonuses given to the motormen who have been classed highest in the three preceding months. The three-monthly bonuses are added to the monthly ones, and form a kind of encouragement for perseverance.

One company includes the inspectors and the supervising motormen in the scheme, enabling them to benefit by the saving in energy realised by the motormen who have not been classed. These officials, indeed, have the only effectual means, namely, warnings or penalties, for bringing into line the motorman who has no desire to compete. The logical consequence of this arrangement should be to bring the consumption by the latter nearer to that by the former, and to prevent that kind of segregation which takes place after several months of the bonus scheme. This arrangement has not, up to the present, given all the results expected; it is hoped, however, to improve it by modifying the basis and so to obtain better results.

One company makes use of special instructors to teach the motormen how to work the car economically. These agents receive variable rewards according to the results they obtain. These rewards have produced good effects.

Certain companies tell us that as a result of the institution of bonuses for the motormen they have had to grant some compensation to the supervising motormen. To increase the salary of the supervisors, thus enabling them to participate, as we have tried to do, in the saving of current due to their personal action, would be a happy solution. Finally, we would say that two provincial companies make it advantageous for the senior officers at the depôts to secure a reduction in the consumption of energy.

Results.

All the companies who have replied to our questions report that the use of meters with bonuses has produced important economies. To mention only the companies who have used meters for one year or longer, the percentage in the reduction of consumption is not less than 8 per cent. It would be difficult to give the various reasons for which two companies did not obtain so much benefit from the use of meters. In general, the advantage realised is greater for the companies who buy their energy than for those who generate it themselves. The decrease in consumption is greater in large undertakings, where the supervision of the motormen is less easy, than in the smaller companies where the care given to the driving of the cars is more satisfactory. The state of mind of the motorman can also influence the result which he will obtain from the meters.

It would not do to give to the amount of economy which we have mentioned above too great a significance. To refer only to the Paris General Tramway Company, we estimate that a part—perhaps important,

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though impossible of exact valuation — of the economies attained is explained by reforms carried out at the same time in the methods of the upkeep of the rolling stock, and in the division of the work of the system, reforms whose effect is added to that of the meters. Nevertheless, there is no doubt that to these latter the most important part is to be attributed.

It is largely to the influence of bonuses that we attribute the reduction of the wear of brake shoes, effected from 1910 to 1912 by the Paris General Tramway Company. This wear has been considerably reduced, in spite of an increase of more than 10 per cent. in the mileage run. The wear on tires has decreased in the same interval, and exactly in the same proportion where the quality of the steel employed remained the same. The similarity which exists in the decrease in the wear of the tires and of the brake shoes, shows plainly that a modification in the hardness of the brake shoes would not suffice to account for the variation discovered. The East Paris Tramway Company has also observed since the introduction of meters a diminution in the consumption of brake shoes.

A majority of the companies report that the introduction of bonuses has been accompanied by an important reduction in the expense of the upkeep of the motors and of the equipment.*

A very important and much discussed question is that of the influence of meters on the working, from the point of view of accidents, and of the regularity of the service. Two systems say they the personal accidents to which these expose passengers become less numerous and less serious.

Four undertakings declare that the institution of bonuses for the economy of energy has caused no troublesome influence on the regularity of the service. All the others say that the running time shows some tendency to vary irregularly. It seems, nevertheless, that more careful supervision would overcome this. If not successful, we would advise the companies to place, as Amsterdam tramways have done, registering clocks at the termini. The motorman is compelled to register, and thus to show how late he arrived. The motorman can be punished for being late by a corresponding sum being reduced from the bonuses for the energy he has saved. The application of this plan, even only occasionally, would, no doubt, bring the motorman who slackens speed in order to save energy back to proper time.

Besides the advantages which the companies unanimously say they have received from the use of meters, they have given us some results of a less general character attributed to their use. One company has observed that by the suppression of potential peaks the demand on the generating station, which was previously irregular, has become quite steady, and that the circuit breaker falls but rarely. Another company states that as the result of the use of meters they have been able to give up a costly plan of extending a sub-station which had become overtaxed in 1909, although the number of car-kilometres fed by this sub-station has been increased by more than 15 per cent.

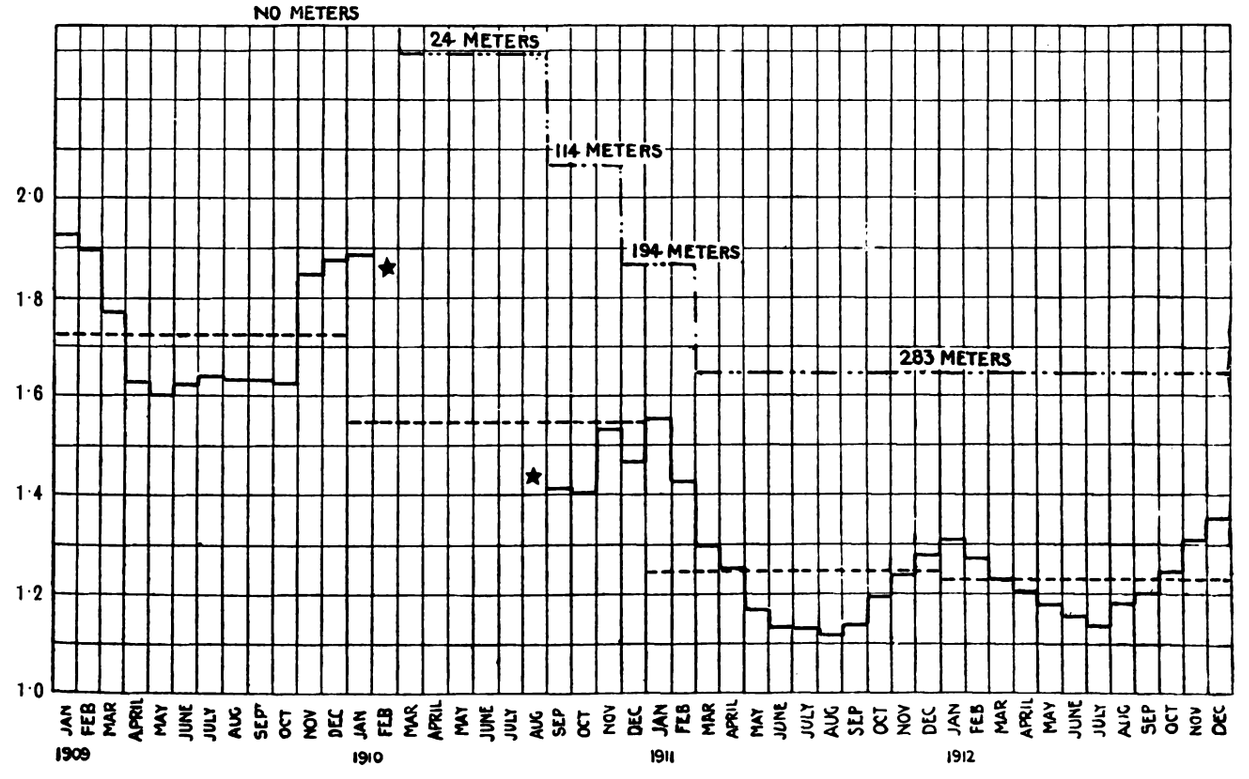
NO METERS
24 METERS
114 METERS
194 METERS
283 METERS
2·0
1·8
1·6
1·4
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Diagram Showing Energy Consumption per Car-Kilometre before and after the Application of Car Meters—Paris General Tramways Company.

* * From February to August, 1910, the normal service was interfered with by floods.

have had a diminution in the number of collisions. Three others have not observed any change. Our opinion is that the influence of meters on collisions is to increase their number and to diminish their seriousness.

The increase in number results partly from the objection which the motormen have in the case of a block to putting on their brakes, as they would have afterwards to start again with a considerable expenditure of energy, and on the other hand, from the habit into which they fall of too freely releasing the brake shoes on their cars. It is wise when meters are put into use to take away from the motormen the means of altering the regulation of their brakes, or at any rate to have them attended to by others. The seriousness of the collisions diminishes because the motormen, desirous of obtaining a bonus, limit to the shortest possible time the period during which they maintain the momentum of the vehicle at its greatest, thus eliminating the risk of more violent collisions and facilitating the final execution of a rapid stop. Altogether, we think that the use of meters diminishes the amount of pecuniary responsibilities caused by collisions. As a result of the disappearance of too violent stoppages and too rapid starting,

* The accompanying diagrams are from the records of the Paris General Tramways Company, and strikingly indicate the advantage that company has obtained from the use of meters. The progressive effect as the number of meters was increased will be seen at a glance.

Cost and Life of Meters.

As all the companies replying make use of meters of the same type, their declarations are more or less the same as regards the price of the installation. This price amounts on an average to 125 frs. per meter.

The life of the meters ranges from five to ten years. Having had three complete years of their use, we estimate in the East Paris Tramways, whose experience is longer, that the length of life, which at the the beginning of 1912 we had estimated at five years, is considerably longer.

The annual cost of upkeep of the meters ranges from 7 to 18 frs. The first of these figures appears to us too low unless it is applied only to the first year of working. Ten and 12 frs. seems to be necessary to provide for the normal upkeep.

The annual cost of supervision required by the meters is estimated at between 18 and 60 frs. per installed meter. The cost depends evidently upon the number and complexity of the statistics prepared as a record of the meters. Certain small systems avoid engaging a special staff for the preparation of these statistics, and leave the work without any special remuneration to the chief of the depôt, who gives the necessary time to it; they thus save an appreciable sum. On the other hand, another undertaking employs special men for the supervision and instruction of the motormen in economic driving.

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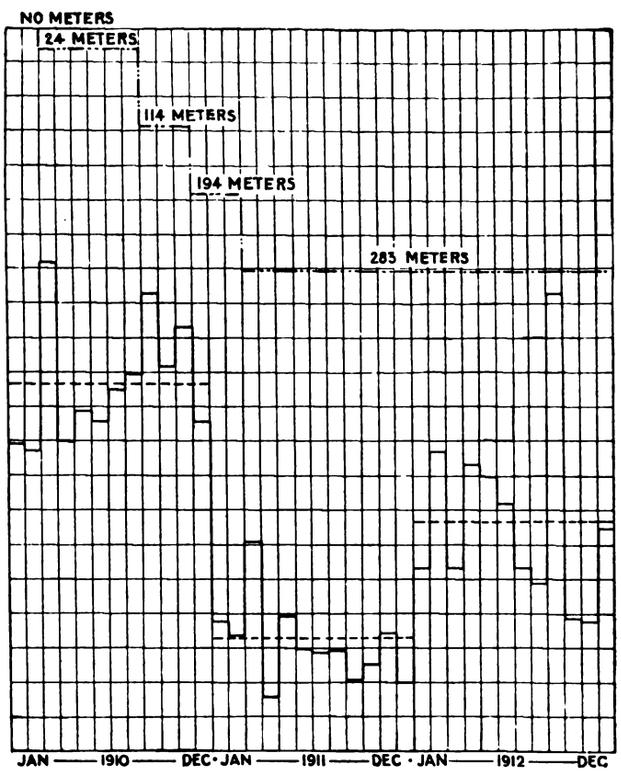

Diagram Showing Relative Effect of Meters on Cost of Maintenance of Armatures.
(Yearly averages marked thus - - - - - -).

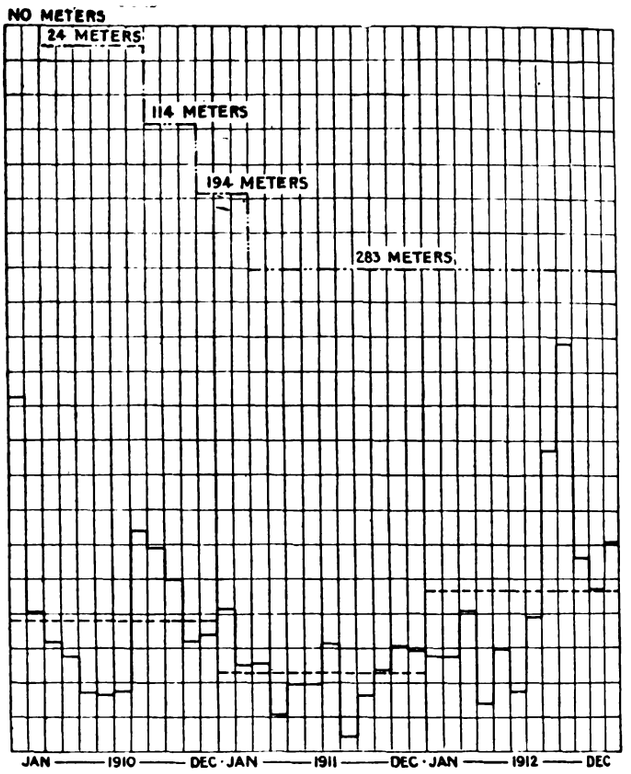

Diagram Showing Relative Effect of Meters on Cost of Maintenance of Motor Fields and Cases.
(Yearly averages marked thus - - - - - -).

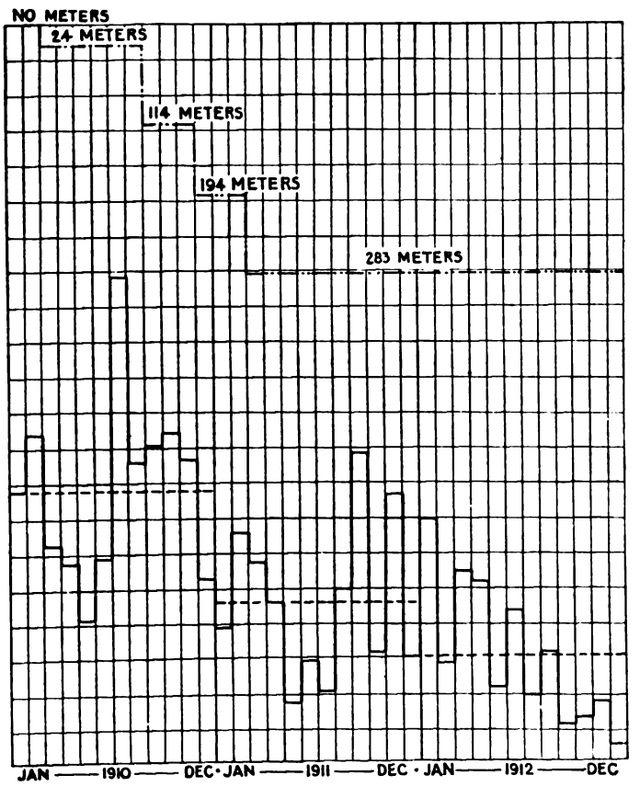

Diagram Showing Relative Effect of Meters on Cost of Maintenance of Electrical Equipment.
(Yearly averages marked thus - - - - - -).

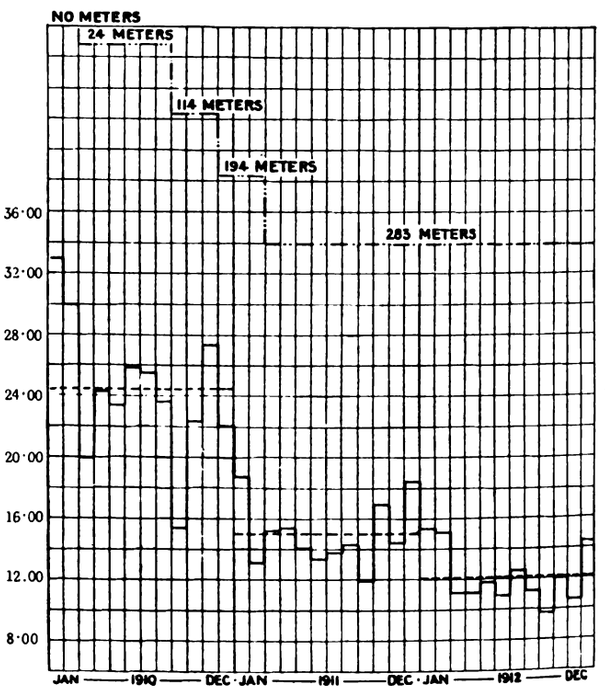

Diagram Showing Number of Electrical Injuries per 100,000 Car-Kilometres.
(Yearly averages marked thus - - - - - -).

Under average conditions we estimate that the cost of administration comes out at 30 frs. per year per meter. The sum distributed in bonuses to the motormen varies very considerably on the different systems, the lowest figure given is 14 frs. per car per year.

An undertaking which intends soon to establish bonuses states that it proposes to distribute to the motormen a third of the gross saving realised in the supply of energy from the sub-stations. We think it desirable to call their attention to the fact that it is best to commence bonuses with prudent moderation. The rapidity with which the consumption per kilometre is reduced during the early months of the use of meters shows clearly that the carelessness of the motormen before they were interested in the consumption of energy entailed great waste. Although it is fair to recompense efforts at reduction, it is not so to remunerate anyone for simply ceasing to waste. It is necessary to distinguish in the driving of the cars two distinct elements; the first is the abandonment of reprehensible practices. There is nothing there

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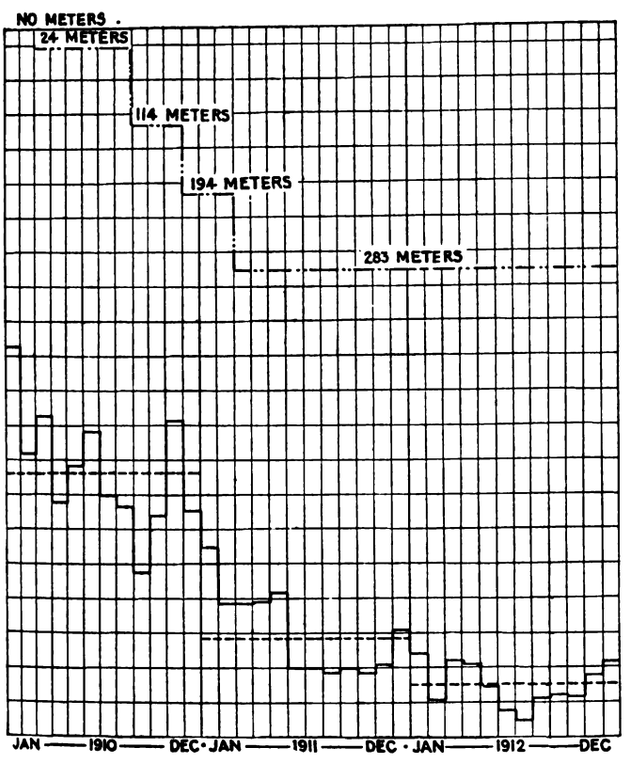
which is really meritorious. The second is a systematic application on the part of the motormen to reduce further the energy already reduced to a normal figure. This second element should alone give rise to a recompense. We then estimate that it would be wise to limit first of all to one-eighth, for example, of the gross saving realised, if one does not wish to distribute exaggerated bonuses. Better still, we advise companies to keep to fixed bonuses, at any rate at the commencement, of an amount calculated carefully, as we have done from the beginning, and as we continue to do at the Paris General Tramway Company with complete success. We have every reason to congratulate ourselves on the effect of the bonuses which we distribute, and, nevertheless, their total is far from reaching a third of the gross saving realised on the distribution of energy from the sub-stations.

Conclusion.

A few years ago certain companies were still contesting whether there was any real use in the distribution of bonuses to the motormen. Starting from the results of certain experiments carried out by German companies, they thought that a satisfactory reduction in the expenditure of energy could be obtained through the effect produced on the motormen by the presence of the meters. Others considered that encouragements or penalties would attain the same end as pecuniary rewards. At present all the companies, at any rate all those who have replied to our questions, distribute bonuses. Indeed, experience has shown



Curve Showing Relative Effect of Meters on the Cost of Brake Shoes.

(Yearly averages marked thus - - - - - -)

purely moral measures, though they produce a temporary reduction in the expenditure of energy, do not produce a lasting result. All the companies, therefore, have established a classification of motormen by means of the readings of the meters.

The statistical tables which lead to this classification include generally a sheet from a little book carried by the motormen, on which a responsible official writes down each day the distances traversed and energy consumed; a table which he fills up at the end of every month; and, last of all, the classification list already mentioned. If certain motormen work on lines with different characteristics, which is the case with those men who are not included in any special division, or on cars of different types, another form should be prepared for registering in separate columns the distances to which certain differential coefficients correspond. The coefficients to be applied are prepared generally by the simple means of the classification of the cars according to their different characteristics, and according to the section they work upon.

The fact of which the majority of the companies appear to be convinced, is the utility of establishing together with the classification of the motormen a classification of the cars. The Rouen Tramways Company states that it obtains very useful information from the statistics with reference to the condition of the rolling stock; that the cars which appear to be defective are kept under observation by the supervising motormen, and, if it is necessary, they are sent to the workshop for inspection. This company considers that this attention produces excellent effects.

If it is necessary to give up the attempt to bring the cars in large undertakings to the same coefficient of resistance to traction, one ought to be able in the small ones to succeed in levelling out almost entirely the individual behaviour of the motor cars, starting from the statistics of the kilometric consumption. One company gives, nevertheless, on this subject, a contradictory opinion. "Experience," it says, "has shown that it was not profitable to proceed to a classification of the cars."

We do not agree with this opinion, although we have not applied as yet the special permanent classification instituted by the Rouen tramways. It frequently happens that we have to search in the statistics of the classification of the cars for indications of the value of some type of fuse box, the utility of a particular method of greasing, the influence of a certain modification in the equipment of the cars, etc. Our statistics guide us in a certain way where other undertakings would proceed gropingly, and would make useless reforms from inadequate observations, or would put off for years a certain improvement which observations of a few months would show to pay for itself, sometimes in less than a year, by the saving in energy effected.

Not to prepare car statistics is to deprive oneself of a definite ergometric method, which is lacking, even in the case of railways, and whose continuous application doubles its value. Also, we consider that we should not hesitate because of the increase of cost, after all not very great, which is required to gather car statistics as well as statistics of the performance of motormen.

We conclude here the first part of our report. As it may be seen we have found in the replies which have been furnished to us data for a very complete series of documents.

LONDON TRAFFIC CONTROL.

The London County Council on January 20 considered a report presented by the General Purposes Committee, dealing in detail with the report of the Select Committee of the House of Commons on motor traffic in London, which was issued in August last. Quotations were given from opinions expressed by various committees of the Council on proposals of the report so far as the work of these committees would be affected. The General Purposes Committee, reviewing all these opinions, came to the conclusion to make recommendations to the Council to the following effect:

That the Council concur with the view of the Select Committee that in all metropolitan traffic matters Parliament should be advised by one department, which should combine the traffic duties of the Home Office, Local Government Board, and Board of Trade.

That the Council signifies its willingness to accept a new Traffic Branch of the Board of Trade as a suitable authority for dealing with traffic matters in Greater London, providing it consists of a small number of specially qualified persons, selected solely on the ground of their competence and holding office for a considerable period.

That County Councils within the area for which this Traffic Branch be established should be empowered to submit proposals for dealing with traffic matters, that the Traffic Branch should consider all criticisms submitted thereon, if advisable hold a public enquiry, give their decision, and if necessary make by-laws.

That Borough Councils within the area should be empowered to submit poposals on matters that fall within their jurisdiction to the Traffic Branch.

That closer control of traffic should be exercised by the police.

That it is desirable that the police should continue to license vehicles, subject to the powers of the Traffic Branch to make by-laws as to numbers, etc.

That traffic points should be fixed at a greater number of crossings.

That more refuges should be provided.

That means should be taken to remove the congestion caused by tramway dead-ends, street markets, and other obstructions.

That the measures already taken through the schools to warn children and parents as to street dangers should be continued and extended.

That the Council concur in the view of the Select Committee to the effect that instead of the limits of the Metropolitan Street Act, 1867, being fixed at six miles from Charing Cross, they should be extended to embrace the whole of the metropolitan area.

That the Council concur in the view expressed by the Select Committee to the effect that a method should be devised by which opinions held by the police as to routes to be taken by proposed tramways may be before the minds of County Councils at an early point, and not be put in an antagonistic position before Parliament.

It was further proposed that these resolutions be communicated to the Prime Minister and the President of the Board of Trade, and that these gentlemen should be requested to receive a deputation from the Council to urge that the Government will at the earliest possible date take all necessary steps to give effect to the resolutions.

After several divisions at the instance of the Progressive party, the resolutions were carried.

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TRAMWAYS AND STREET TRAFFIC IN AMERICAN CITIES.

A Report by Mr. James Dalrymple
(General Manager, Glasgow Corporation Tramways).

Mr. James Dalrymple, general manager of Glasgow Corporation Tramways, who with the master of works of the city recently visited various cites in the United States and Canada, has presented to the City Council a long report. Mr. Dalrymple modestly described the document as "Notes." The report consists of a running narrative of the journey and of the various places and things which were investigated, but it contains many interesting observations and comparisons with practise and developments on both sides of the Atlantic, and space permits only a summary of the many subjects to which Mr. Dalrymple refers. The notes are by no means of a technical nature, and are intended merely as a preliminary to a report which is to follow on the special subject of bridges across rivers in cities. It was in view of the proposals now afoot for the construction of additional bridges across the Clyde in Glasgow, for the accommodation for tramway and other traffic, that the two gentlemen conducted their special inquiry in regard to bridges in American cities. They also, however, investigated the conditions of working of tramway or street railway systems, and devoted a good deal of attention to various branches of municipal administration. Beginning with Monday, August 18 last, when the deputation started their inquiries in New York, the following is an abstract of points in the report dealing with tramways and kindred matters:

American Municipal Government.

One thing which grieved us much, not only in New York, but everywhere we went, both in the United States and in Canada, was the uncomplimentary way in which the American speaks of his municipal representatives. We scarcely ever heard a good word spoken in regard to a city councillor. We endeavoured to get some definite information as to alleged evil practices on the part of city representatives, but entirely failed. We came to the conclusion that it was simply the correct thing to blackball everybody who happened to have any connection with city government. A change in civic administration is at present being made in a large number of cities. A new form of city government known as the commission form is being widely adopted. Under the new charter the citizens, instead of electing their representatives in the usual way, elect, say, five, seven, or nine of their number to run the city for a given number of years. These commissioners receive a salary, and they devote the whole of their time to city work. This form of government has not yet had a thorough test, and it has not yet been definitely decided whether it will work out any better than the old form. We doubt very much whether this is the last word in city government.

In going over the outlying parts of New York, and also of many other cities, we were very much interested in the work of town planning which has been carried out. In many instances we found the whole of the countryside town-planned for miles beyond the built-on portions of the cities.

New York Traffic Arrangements.

No city in the world has the same traffic problems to solve as New York. In Manhattan Island alone there are 457 miles of surface lines, 120 miles of elevated lines, and 71 miles of subway lines. These together carry only about 1,100 million passengers. There is a univeral five cent fare. The street railway company have been experimenting with various types of cars, among them the double-decker. It is different in many respects from our type of double deck car, but it seemed to suit the conditions quite well, and was highly spoken of by the general manager. The only other double-deck car we saw in service was at Pittsburg. The door is in the centre of the car, and the step and floor are close to the street, so that it is easy to enter and leave. We did not care to sit in the lower portion of the car, as it gave one a feeling of being too near the street. There are also in service a number of single-deck cars with this low floor. The conductor is placed at a cash desk opposite the door, and every passenger pays his fare as he enters. The door is under the control of the motorman, who opens and closes it at a signal from the conductor. In this way accidents have been almost entirely eliminated. On the cross-town lines we were much interested in the storage battery cars, which appeared to answer the purpose all right. They are, however, of no use for heavy main line traffic. Every year, as another 40 or 50-storey office building is erected, the problem of meeting the congestion of traffic is becoming more difficult, and arrangements have recently been made for extending both the elevated and the subway systems. These extensions are estimated to cost about 60 million pounds. The total liabilities of the whole Corporation of Glasgow are only 17 million pounds. We thought that the paving of the streets in New York, and the condition of many portions of the tramway track, were the worst we have ever seen, but the streets of New York are quite respectable when compared with the streets of some cities which we afterwards visited.

We spent a good deal of time in automobiles, and had ample opportunity of watching the way in which the traffic, especially motor traffic, was regulated. Glasgow could learn a splendid lesson from New York in regard to this matter. The New York chauffeur carries out the police regulations to the letter. One had the feeling in driving through the city that the drivers of vehicles were under complete control.

Wages and Fares.

As a general rule the wages of tramway men in the United States are higher than in this country, the maximum being reached in San Francisco. One great drawback to the successful operation of tramways is the change which is continually going on in the personnel of the staff. In some systems almost the entire staff changes every year. Americans never seem to join the street railway service with the intention of remaining at this work, as they can very often do better. The street railway companies are consequently continually burdened with a large proportion of new hands. In regard to the system of fares, discount tickets, and transfers, these arrangements must lead to a great deal of abuse. It does not seem to be of much consequence whether the conductors are honest or not so long as the company gets a fair return. This system of working is not good for the company, its employees, or the public.

On the morning we arrived at Toronto the city had opened a short municipal line. The whole of the company franchises do not expire for some years, but the city is apparently going to take over the operation of each section as the franchise expires. Since returning home we have heard that there is every likelihood that Toronto will shortly municipalise the whole of its tramway system. The idea of municipalisation of street railways is no doubt gaining ground in the United States. In Detroit the City Council and the company have been having some conversations, and there seems to be a pretty strong feeling in the city in favour of municipalisation. Before leaving Detroit the street railway company ran us out over one of their interurban lines, and we had a sample of what rapid transit really means. We went along comfortably at over 60 miles an hour. The interurban car in America is a great institution, and there are very few places without their interurban systems.

Chicago has a very interesting transportation problem. Over the Chicago River there are innumerable opening bridges. There are also several elevated lines which converge on a central loop. Nothing has yet been done in regard to a proposal for underground lines, but there is a deep tunnel connecting the large warehouses in the central district which is used for delivering goods.

In regard to the electric railway system in Minneapolis and St. Paul, the manager showed us his new workshops, which are the largest and most complete that we have ever seen. As a general rule the street railway companies in the United States have not spent much on their workshops and car sheds. Things are, however, now improving very much. We were much interested in the newer style of car shed, which seemed only to be used when the cars were being cleaned or inspected. At other times the cars were allowed to lie out in the open. This free and easy way of storing tramcars is becoming fairly general. The Americans do not trouble themselves as much as we do in regard to the cleaning of their cars, and consequently these can be stored in the open with less inconvenience than would be experienced here.

Scotsmen in Vancouver.

On September 10 we arrived at Vancouver. The citizens there are perfectly satisfied that their city some day will be the centre of the British Empire, and we see no reason why that dream should not be realised. The city has every advantage that nature can bestow, and it is full of Scots. When we called to see the president of the street railway company the member of the staff who received us said, "I used to be a conductor at Possilpark depot." When we were taken to see the car sheds we found the man in charge had been trained in our Langside depot. As we rode on the street cars many of the conductors informed us that they were old Glasgow tramway men, and that the old Glasgow men on the system numbered about 70. A large number of tramway men who a few years ago lived in Cowcaddens, Govanhill, and Bridgeton, now own their own homes in Vancouver, and have been speculating in real estate.

In San Francisco there is the only municipal tramway in the United States. About a year ago the citizens decided to start a municipal line in Geary Street, which extends right through the city. There should be nothing to hinder this line from being financially successful, and extensions of it are contemplated. As the working week in San Francisco is 48 hours, the motormen and conductors work an eight hour day, and receive therefor three dollars, equal to 12s. 6d. It is likely that as the leases of other portions of the tramway system expire these portions will also be municipalised.

In regard to Los Angeles, we knew the city best because of its remarkable tramway system. It is generally admitted among tramway men that the Los Angeles city and suburban street railway systems are in many ways the finest in the States. The population in 30 years has grown from 10,000 to 400,000, and within the city limits

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there are over 350 miles of track, and the lines radiating from the centre of the city to the various suburbs extend to over 700 miles. The lines which constitute the city system are owned and operated by one company, and the interurban lines are owned and operated by another company.

In Washington we were much impressed with the way in which the traffic was handled by the electric railway company. The whole scheme seemed to be carried out in every department in first-class style.

Philadelphia Conditions.

The street railway system in Philadelphia is very extensive, and proposals are being made for further extensions, both underground and elevated, which are to cost many millions of pounds sterling. The cars in Philadelphia have the entrance and exit at the motorman's end. It is thought that there is less liability to accident when the passengers both board and leave the car under the eye of the motorman. We noticed in Philadelphia, perhaps more than in any other city, the effect of the stringent regulations for the conduct of street traffic. Any person who wished to board or leave a car could do so in perfect safety, as no driver of either a horse vehicle or motor vehicle would attempt to pass between the car and the kerb at a car stopping place. The education of those in charge of vehicles on the streets in Glasgow is very deficient when we consider what has been done in this connection in many American cities.

We attended a baseball game in Philadelphia in order to see how the crowd was handled. The whole procedure was very disappointing Neither the cars nor the other vehicles seemed to be well handled when the crowd of spectators was dispersing. In fact, in no American city have the people any conception of what the attendance at an important football match in Glasgow really means.

The last few days of our tour were spent at Atlantic City. During the week ended October 18 the annual convention of the American Electric Railway Association was held in Atlantic City, and hundreds of tramway men had travelled thousands of miles to attend this convention. The papers and reports covered a very wide field, and all the subjects were dealt with in a complete manner. One important feature was the exhibition of tramway appliances. We were very much surprised to see such a large exhibition, and although it was entirely confined to tramway plant the floorage occupied might be as large as the machinery hall of one of our international exhibitions.

Some General Impressions.

We returned to New York on October 17, and had a last look round. It has been found necessary to make further provision for the ever increasing traffic in the city, and arrangements have been made between the municipality and the operating companies for the expenditure of about 60 million pounds in extensions, At present in greater New York there are about 1,500 miles of tramway, elevated and subway lines. The annual revenue amounts to over £16,000,000, and the passengers carried totalled last year about 1,700 millions. The average number of passengers per head of the population works out at 338, which is practically the Glasgow average. None of the other large cities reach this figure. One very striking difference between the American cities and Glasgow is the number of passengers carried per car-mile. In America the cars carry from five to six passengers per car-mile. This figure represents what are called revenue passengers. If transfers are included the average would be somewhat higher. In Glasgow we are now carrying over 14 passengers per car-mile. Of course, the revenue from five passengers on an American car is greater than the revenue from 14 passengers on a Glasgow car. When we were informed that in the four chief cities, namely, New York, Chicago, Philadelphia, and Boston, the capital expended on the transit systems amounted to about 100 million pounds sterling, and that arrangements have been made for the expenditure of another 100 million pounds, we thought it was time to say "good-bye!"

During our visit we were particularly interested in the problem of traffic congestion. In no city did we see congestion of car traffic such as could be seen in Glasgow any day at the corner of Argyle Street and Jamaica Street. The city authorities of the United States would not submit to this condition of affairs for a week without setting about to find a remedy. The citizens seem to have a better appreciation of the value of time than we have. In many cities it seemed to us as if there was a bridge opposite every street. We are satisfied that as long as we can carry our passengers on the surface no subways or elevated structures should be built.

The Proposed Glasgow Bridges.

During the last few years the car traffic in Glasgow has increased enormously, and we are making provision for dealing with further increases, as in a short time there will be 150 more cars on the streets. There is no doubt whatever that a bridge must be built by the tramway department at Oswald Street, and another bridge at Dixon Street. In regard to the Oswald Street proposal, everybody knows that a fixed bridge cannot be built any further west, and it must be evident to all that an opening bridge is no use for a close service of cars. Then we must have a bridge at Dixon Street in order to relieve Eglington Street. A new line of tramway should be laid from near Eglington Toll, along Abbotsford Place and South Portland Street. The terminus of this line could be, meantime, in St. Enoch Square.

Many of the cities of the United States are groping for the best type of car for dense city traffic, and many changes have been made within recent years. We think, however, that the consensus of opinion now is that our light single-truck car carrying about 60 passengers answers the purpose best of all. Of course it has its drawbacks. We cannot, for instance, make it adaptable so readily for the pay-as-you-enter system. We went very fully into the question of fares, and were satisfied that we were on the right lines, and every tramway man in the States is now also satisfied that the graded or zone system of fares is the correct one.

[In addition to the towns mentioned in the above abstract, the report also contains notes regarding the visits of the deputation to several other cities.]

BRITISH ELECTRICAL MANUFACTURERS' ASSOCIATION.

Annual Dinner.

The annual dinner of the British Electrical and Allied Manufacturers' Association was held at the Savoy Hotel, London, on January 21. The Rt. Hon. Lord Ampthill, G.C.S.I., the president of the Association, was in the chair, and there were present more than 400 members and guests, including representatives of all branches of the electrical industry. Among those present were :

Lord George Hamilton, Sir William Wiseman, Colonel H. C. L. Holden, Sir John MacCall, Sir J W. Taverner, Sir D. Yule, Dr. W. C. Unwin, Messrs. F. E. Smith, K.C., M.P., G. A. Touche, M.P., J. M. Henderson, M.P., J. Annan Bryce, M.P., F. R Davenport, F. H. Nalder, A. D. Williamson, A. P. Wood, B. Longbottom, W. O. Smith, F. C Gibbons, E. S. New, P. A. Lange, Wm. Johnson Galloway A. H. Stanley, C. P. Sparks, H. F. Parshall, W. Rutherford, Jas. Devonshire, J. Aldworth, H. C. Levis, Samuel Insull, L. B. Atkinson, Owen H. Smith, H. Hirst, W. Duddell, A. Bruce Anderson, W. E. Garforth, Glazebrook, Faithfull Begg, W. T. Stubbs, C. Koettgen, Herbert W. Ely, A. W. Tait, J. McNaught, W. M. Mordey G. F. Preston, O. H. Baldwin, R. W. Blackwell, E. Hatton, C. H. Dade, Fearnside Irving, Weekes, D. N. Dunlop (secretary), and many others.

The speakers included Lord Ampthill, president of the Association, Mr. A. Bruce Anderson, chairman of the Association Council, Mr. F. E. Smith, M.P., Mr. W. Duddell, president of the Institution of Electrical Engineers, the Rt. Hon. Lord George Hamilton, and Mr. F. R. Davenport. The principal topic of the evening was the condition of the British manufacturer in the face of increasing competition from abroad and the handicap of foreign tariffs, which curtail his market while no similar restraint is placed upon the activity of foreigners in the United Kingdom.

Lord Ampthill, in responding to the toast of the Association, proposed by Lord George Hamilton, who had referred to the Association's patriotic gift of a complete equipment of British electrical instruments to the Hong-Kong University, said that this electrical equipment had cost £5,000, and would be instrumental in maintaining the reputation of British electrical enterprise in the Far East. A debt of gratitude was due to Messrs. A. Bruce Anderson and Hugo Hirst, who had put this matter through, and also to Mr. Arthur Preece for his supervision and erection of the equipment. Referring to the prospects of the Association, he looked forward to the time when the members would be doing something more than making a living. He hoped that they might make great fortunes. It would then be possible for them to put back surplus profits into the development of British industry and improving the conditions for the working classes. At present the wealth of the country was in the hands of the few, and until it was distributed the demand for labour would not continue to increase. Manufacturers until they were helped by the State must help themselves, and assert their rights until they obtained their objects.

THE MUNICIPAL TRAMWAYS ASSOCIATION.

Annual Volume of Proceedings.

The annual report of the Municipal Tramways Association (Incorporated), containing a verbatim report of the proceedings at the annual conference held at Sheffield in September last, together with copies of the various papers read and discussed at that conference, has now been published by the Hon. Secretary, Mr. C. J. Spencer, and copies can be obtained from him at his offices, 5 and 7, Hall Ings, Bradford, at the price of 5s. per copy. There are many papers in this volume of considerable interest to tramway operators, who will find the report extremely useful for reference. Corporations desirous of obtaining a number of copies are requested to make early application to the honorary secretary.

Annual Dinner of the Tramways and Light Railways Association.—The annual dinner of this Associaton will be held at the Trocadero Restaurant on Friday, March 6. The chair will be taken by the Rt. Hon. Viscount Chilston, president of the Association.

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BOARD OF TRADE TRAMWAY RETURN.

The annual return by the Board of Trade on street and road tramways and light railways for the year ended December 31, 1912, in respect of companies, and for the year ended March 31, 1913, in respect of local authorities, was issued on January 15. A comparative table shows that since the year 1878 the route length of tramways and light railways on public roads open for traffic in the United Kingdom has increased from 269 miles to 2,662 miles; the capital expenditure from £4,207,350 to £79,359,758; the number of passengers carried from 146 millions to 3,220 millions; and the net receipts from £230,956 to £5,588,121. The number of passengers carried in the year 1912-13 is equal to about 71 times the estimated population of the United Kingdom.

Of the total of 1,818 miles of line owned by local authorities, 1,617 miles are worked by those authorities themselves or (in a few cases) by other local authorities leasing from them, and the remaining 201 miles by leasing companies. The return also includes 13 miles of trackless trolley route worked by the owning local authorities. Last year the route mileage worked by electric traction was 2,518 miles out of a total of 2,637; this year it is 2,546 miles out of 2,662, the remainder being 4·4 per cent. of the total length of line. The details are given in the following table:

TABLE SHOWING LENGTHS WORKED BY VARIOUS METHODS OF TRACTION.

Method of Traction.	England and Wales.	Scotland.	Ireland.	Total.
	M. Ch.	M. Ch.	M. Ch.	M. Ch.
Electric .. .	2,130 63	278 74	136 14	2,545 71
Steam	12 30	—	29 46	41 76
Cable	1 49	23 76	—	25 45
Petrol motors	1 15	—	—	1 15
Gas motors	4 2	—	—	4 2
Horse .. .	31 63	4 28	6 75	43 6
Total (Tramways)	2,181 62	307 18	172 55	2,661 55
Trackless trolley ..	11 27	1 20	—	12 47

The next table gives a few totals, ratios, and percentages for the last two years, in comparison with a typical "steam" period (*i.e.*, a period in which the use of steam power on tramways was at its maximum) and a typical "horse" period:

With regard to the appropriations for interest or dividend, etc., the return has not been restricted to showing the disposal of the net receipts earned during the year. The total amount allocated is now given, and the return shows that in 25 cases it was necessary to seek aid from rates to meet some part of the charges for the year (including interest and redemption of tramway debt). The total amount thus obtained was £64,988, as compared with £62,132 in the previous year.

The gross receipts for the whole of the undertakings amounted to £14,972,919, against £14,726,068 in the previous year. The working expenditure was £9,384,798, against £8,924,420, and the net receipts were £5,588,121, against £5,801,648. The number of cars was 12,773 electric and 487 non-electric, compared with 12,435 and 509 respectively. The number of Board of Trade units of electrical energy used was 586,106,417, against 548,696,979.

The third table shows that of the 286 undertakings, 171 belong to local authorities and 115 to companies or other parties. The net receipts of local authorities who work tramway undertakings belonging to them or leased from other local authorities amounted to £4,095,957 on the year's traffic, and they applied £1,299,350 towards the reduction of tramway debt, and £544,478 in relief of rates, while carrying £746,749 to reserve and renewal funds. In the cases of four local authorities and seven companies, the returns for tramways show an excess of working expenditure over gross receipts. Two trackless trolley systems also show a deficiency.

PROVINCIAL OMNIBUS OWNERS' ASSOCIATION.

The above-named organisation has been formed for the purpose of promoting the interests of owners of motor omnibuses in other than the metropolitan area. A council to comprise 20 members is to be appointed, and the following gentlemen have already agreed to serve thereon: Messrs. H. S. Day, Worcester Electric Traction Company; T. M. Foster, Aldershot and District Traction Company; W. F. French, French, Bannister, and Company, Margate; S. E. Garcke, British Automobile Traction Company, Macclesfield, Deal, and Warwick; J. A. Lycett, Birmingham and Midland Motor Omnibus Company; A. Douglas Mackenzie, Worthing Motor Services; W. O. Pritchard, Autocar Services, Tunbridge Wells; H. J. Robinson, Maidstone and District Motor Services; S. E. Smith, Bristol Tramways and Carriage Company; J. B. Walford, Ortona Motor Company, Cambridge. Offices have been opened at 11, Old Jewry Chambers, London, E.C.

Tramways in the United Kingdom.	1911-12. Electric Period.	1912-13. Electric Period.	1898. Steam Period.	1879. Horse Period.
Miles of route open	Tramways: 2,637·05 Trackless Trolley: 5	Tramways: 2,661·69 Trackless Trolley: 12·59	1,064·19	321·27
Total number of passengers carried	3,127,318,732	3,219,857,293	858,485,542	150,881,515
Number of miles run by cars	323,354,389	334,777,515	90,593,716	19,418,373
Capital expenditure per mile of single track open:				
Lines and works	£13,623	£13,726	£7,770	£7,840
All items	£18,005	£18,229	£10,469	£9,877
Percentage of net receipts to total capital outlay	7·50	7·04	6·38	3·97
Do. to net capital outlay (eliminating amounts expended on construction or purchase of old lines and works now superseded)	8·15	7·64	Not available	—
Percentage of working expenditure to gross receipts	60·60	62·68	76·93	83·81
Passengers carried per mile of route open	1,183,620	1,204,011	806,703	469,641
Passengers carried per car-mile	9·67	9·62	9·48	7·77
Average receipts per passenger	1·079d.	1·065d.	1·23d.	1·84d.
Amount paid in relief of rates out of profits of undertakings worked by local authorities	£488,509	£544,478	Not available.	

TABLE SHOWING TRAMWAYS AND LIGHT RAILWAYS BELONGING TO LOCAL AUTHORITIES AND COMPANIES.

	Capital Expenditure on Lines and Works Open for Traffic.	Total Expenditure on Capital Account.	Length Open for Traffic. Double.	Single.	Total.	Number of Undertakings.
	£	£	M. Ch.	M. Ch.	M. Ch.	
Local authorities	40,397,073	54,499,784	Tramways: 1,279 0 Trackless Trolley: —	538 45 12 47	1,817 45 12 47	171
Companies and private individuals .. .	*19,361,637	*24,859,974	412 71	431 19	844 10	115
Total, United Kingdom	£59,758,710	£79,359,758	Tramways: 1,691 71 Trackless Trolley: —	969 64 12 47	2,661 55 12 47	286

* These figures include cost of buildings and equipment in respect of certain local authorities' lines worked in conjunction with other lines.

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NOTTS. AND DERBYSHIRE TRAMWAYS.

COMPLETION OF THE RIPLEY TO NOTTINGHAM SECTION.

Some advice as to the attitude local authorities should adopt towards tramway enterprise promoted by private companies was given at a luncheon at the Victoria Hotel, Nottingham, on January 15, by Mr. George Balfour, of Messrs. Balfour, Beatty, and Company, Limited. Some 250 representatives of the Nottingham City Council, the Nottinghamshire and the Derbyshire County Councils, and local Urban District Councils had assembled to meet the directors of Tramways, Light, and Power Company, Limited, for whom Messrs. Balfour, Beatty, and Company have constructed a line of tramway from the thriving mining town of Ripley, Derbyshire, into Nottingham. This line passes through several growing industrial localities, and supplies a long-felt want as the railway communication with Nottingham is not at all of a convenient character.

In replying to the toast of prosperity to his firm, Mr. Balfour said it would be mock modesty on his part if he were to say that they had not had enormous difficulties to overcome in getting that line constructed. He was glad to say that the officials of the Nottingham City Council and of the other Councils affected had, while fighting for their own ends, met them in a reasonable and businesslike spirit. (Applause.) The company could not develop any tramway if they had to face the hostility of the local authorities. Now that their work was complete he could say without making it personal to that district that local authorities should be more reasonable and sensible in dealing with outside promoters. (Hear, hear.) They should at first make sure that they were dealing with honourable men, who would fulfil their obligations in the spirit and to the letter, and then encourage them to build those interurban lines and power-stations in districts which could not possibly be served by municipal enterprise. (Hear, hear.) The difficulties that had so often to be contended against on account of the attitude of local authorities called for efforts which would accomplish four or five times the amount of work in countries where such troubles were not created.

Viscount Chilston, chairman of Tramways, Light, and Power, Limited, who presided, proposed "The City and Corporation of Nottingham," and in doing so he touched upon the way in which the city had kept abreast of the times. That position, he remarked, had been secured not only by the skill of their workmen, or by the capital and the enterprise of their merchants and employers, but also by the wisdom shown by the Corporation in administering the city's affairs.

The Mayor (Councillor Ball) observed that some of their ratepayers thought they were a little bit in front of the times, while others considered they were behind. The citizens welcomed the enterprise of the Tramway Company—(applause)—who had carried out that excellent scheme of communication between the outlying districts of Notts. and Derbyshire and their city. They heard a great deal about spreading the people over a larger area of the country, and he claimed such a scheme as theirs—which would be impossible for a local authority to have carried out—had that effect. (Hear, hear.) It was not only of great usefulness to the State, but to the surrounding districts. He believed also that it would be financially advantageous to the city, as it would bring people in to do their shopping there. They desired to congratulate the company on the successful completion of their work, and to wish them every success. He hoped their dividends would be such as to encourage them to construct other lines into the city. (Applause.)

Sir J. Turney, whose name was also linked with the toast, declared that the citizens were delighted that the company had had the courage to carry out that work. Of course, they knew why they helped them to do it; it was because they thought the tramway would do the town some good. (Laughter.) He hoped those who had put their money into the venture would realise their ambitions.

Prosperity to the "Nottinghamshire and Derbyshire Tramways," to give the system its official title, was proposed by Councillor Swain. Speaking as chairman of the City Tramways Committee, he assured the company that they meant to do what they could to help on that line. (Applause.) He took that opportunity of recording their gratitude to Mr. Balfour for the way he had met the committee during the various negotiations, and he paid a warm tribute to his skill as an engineer and promoter.

Mr. A. R. Holland, the only original member of the company, replied, and in the course of his observations remarked that he wished Councils would be a little less exacting as to road widenings, but he was glad to hear that great improvements had been effected by the labour and money of the tramway company.

Sir John McCraith thanked Messrs. Balfour, Beatty, and Company for their hospitality; a toast which was enthusiastically drunk and acknowledged by Messrs. Balfour and Beatty.

In addition to the speakers already named, the company present included Sir John McCraith, Mr. John Aldworth (general manager, Nottingham Corporation Tramways), Mr. L. K. Edge (Notts. County Council), and Mr. Beatty.

TRAMWAY CHAIRMEN FOR 1913-1914.

The following is a list of chairmen and vice-chairmen of Tramway Committees appointed since the November elections. There are, as usual, comparatively few changes:

Town.	*Chairman.*	*Vice-Chairman.*
Aberdare	Councillor E. M. Hann.	
Aberdeen	Councillor J. A. Smith.	
Accrington	Alderman Higham	*Councillor Morley.
Ayr	Police Judge Ferguson	Bailie Gould.
Bacup	Alderman Maden	Alderman J. Craven-Hoyle.
Barking	Councillor A. E. Martin.	
Belfast	Alderman Sir R. Anderson	Alderman J. S. Finnigan.
Bexley	*Councillor T. Rattenbury.	
Birkenhead	Councillor H. Halsall.	
Birmingham	Councillor H. Barrow.	
Blackburn	Alderman W. Thompson	*Alderman Nuttall.
Blackpool	Alderman Brodie	Councillor Holt.
Bolton	Alderman Miles	*Councillor P. Higson.
Bootle	Councillor Booth	Councillor Pennington.
Brighton	Alderman F. J. Wilson.	
Burnley	Councillor E. Heap	Councillor Irving.
Burton-on-Trent	Alderman J. S. Rowland	Alderman T. E. Lowe.
Bury	Alderman Collinge	Councillor Hargreaves.
Cardiff	Alderman Sir J. W. Courtis	*Councillor A. J. A. Stone.
Chester	Alderman J. Jones	Councillor J. Dodd.
Chesterfield	Alderman Shentall.	
Colchester	Councillor Jarmin	Councillor Bailey.
Coventry	Councillor Pridmore	*Councillor Pugh.
Croydon	*Alderman G. J. Allen	Councillor J. O. Pelton.
Darlington	Councillor T. E. B. Bates.	
Dartford	Councillor S. K. Keyes	*Councillor R. Bennett.
Darwen	Alderman J. Tomlinson	Councillor G. P. Holden.
Derby	Alderman R. W. Spriggs	*Councillor Dean.
Devonport	Alderman J. C. Tozer	Councillor J. F. Cole.
Doncaster	Councillor Stirling (Mayor)	Councillor Balmforth.
Douglas	*Councillor J. Kelly.	
Dover	*Councillor E. E. Chitty	*Councillor Barwick.
Dundee	Councillor G. A. Johnston.	
East Ham	*Councillor T. H. Cowper.	
Eccles	Alderman Nuttall	*Councillor A. Crimmock.
Edinburgh	Councillor J. Harrison.	
Erith	Councillor G. C. Humphreys.	
Exeter	*Councillor T. Linscott	*Alderman H. B. Varwell.
Farnworth	Councillor W. B. Richardson.	
Glasgow	Councillor R. Kirkland	Councillor Jas. Alston.
Gloucester	*Councillor J. O. Roberts	*Councillor C. J. Ramstedt.
Great Yarmouth	Alderman C. A. Campling	Councillor J. T. C. Salmon.
Haslingden	Councillor Waddington	*Councillor Haworth.
Heywood	Councillor J. Ashworth	Alderman T. Popple.
Huddersfield	Alderman J. H. Aston	*Councillor J. Barlow.
Hull	Councillor J. H. Hargreaves (Mayor)	Councillor W. Wheatley.
Ilford	Councillor R. Stroud	Councillor J. Deveson.
Ilkeston	Alderman S. Shaw	Alderman W. Tatham.
Kilmarnock	Councillor Finlay.	
Kirkcaldy	Councillor Fergusson,	
Lancaster	Councillor Wilkinson.	
Leeds	*Alderman R. A. Smithson	Alderman H. Brown.
Leicester	Alderman S. Flint	Alderman G. Banton.
Leith	Judge Hall.	
Leyton	Councillor H. Heather.	
Lincoln	Alderman W. S. White	Councillor M. A. Ashley.
Liverpool	Alderman F. Smith	Major R. J. Clarke.
Lowestoft	Councillor F. Spashett.	
Luton	Alderman Wilkinson.	
Maidstone	Councillor Lyle	Councillor Green.
Manchester	Alderman J. Bowes	Councillor A. W. Chapman.
Middlesex	Alderman H. Burt	*Councillor F. Goodyear.
Nelson	Councillor W. F. Cooke.	
Newcastle	Alderman J. S. Rodgers	Councilor R. Mayne.
Newport, Mon.	Councillor J. Moxon	Alderman F. Phillips.
Northampton	Councillor T. D. Lewis	Councillor W. Beale.
Nottingham	Councillor R. H. Swain	Alderman F. R. Radford.
Oldham	Alderman F. G. Isherwood	Councillor F. Elliot.
Oxford	*Alderman E. J. Brooks	Alderman F. W. Ansell.
Perth	*Councillor Calderwood	
Plymouth	Alderman S. H. Phillips (Deputy Mayor).	
Portsmouth	Alderman J. H. Corke (Mayor)	Councillor J. Timpson.
Preston	*Alderman J. Ormrod	*Councillor T. Parkinson.
Radcliffe	Councillor Walker Allen.	
Rawtenstall	Alderman H. Coupe	*Councillor J. W. Stansfield.
Reading	Alderman Chas. G. Field (Mayor).	
Rochdale	*Alderman Taylor.	
Rotherham	Alderman D. L. Winter	Councillor T. Reeves.
Salford	Alderman H. Linsley	*Councillor W. H. Barrett.
Sheffield	Alderman Sir W. Clegg	Councillor A. T. Bescoby.
Southampton	Alderman F. A. Dunsford.	
Southend	Alderman A. Martin.	
Southport	Councillor T. S. Richardson.	
South Shields	Alderman W. G. Wylie	Alderman J. W. Henderson (Deputy Mayor).
Stalybridge	*Alderman R. Wood	*Alderman Wm. Lee.
Stockport	Alderman C. Sharples	Alderman W. E. Hamnett.
Sunderland	Councillor G. New	Councillor W. Walker.
Swansea	*Councillor A. Sinclair	Alderman G. H. Colwill.
Swindon	*Councillor J. J. Shawyer	*Councillor T. C. Newman
Wallasey	Alderman J. Farley	*Councillor W. Eastwood.
Walsall	Alderman J. Cope	Alderman J. Williams.
Walthamstow	Councillor E. Samuels.	
Warrington	*Councillor Dr. G. W. Joseph	Councillor J. Wilkinson.
West Bromwich	Alderman Turley.	
West Hartlepool	*Councillor Martin	*Councillor Charlton.
Wigan	*Councillor R. Fletcher	*Councillor J. Walkden.
Wolverhampton	Alderman Sir C. T. Mander	Alderman Craddock.
York	Alderman S. W. Meyer	Councillor S. H. Davies.

* Indicates a change in the chairmanship or vice-chairmanship.

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FINANCIAL REPORTS.

Lima Light, Power, and Tramways Company.—A quarterly dividend of 1 per cent. is announced.

Sao Paulo Tramway, Light, and Power Company.—The usual quarterly dividend of 2½ per cent is announced.

Belfast Tramways.—For the year 1913 the Corporation tramways receipts totalled £266,004 as against £245 596. The receipts constitute a record.

Rio De Janeiro Tramways, Light, and Power Company.—The board have declared a dividend of 1¾ per cent. on the issued capital stock.

Brazilian Traction, Light, and Power Company.—A dividend of 1½ per cent. on the issued ordinary stock, payable February 20, has been declared.

Electric Construction Company.—An interim dividend at the rate of 7 per cent. is announced on preference shares for the half-year to November 30.

Walter Scott, Limited.—The directors have declared an interim dividend on the ordinary shares at the rate of 5 per cent. per annum for the half-year ended December 31, 1913.

Anglo-Argentine Tramways Company.—The recent issue of debenture stock of this company was subscribed twice over. Shareholders have been allotted about 75 per cent, and the public about 25 per cent.

City of Buenos Ayres Tramways.—The directors recommend a balance dividend of 1s. 3d. per share, making 5 per cent. for the year, that £5,000 be transferred to the general amortisation fund, and that £168 be carried forward.

Blackpool and Fleetwood Tramroad Company.—The directors announce a final dividend of 4½ per cent. and a bonus of 2 per cent., making 8½ per cent. for the past year, adding £5,000 to the depreciation reserve, and £2,500 to the general reserve.

British Columbia Electric Railway.—A dividend at rate of 5 per cent. per annum on 5 per cent. preferred ordinary has been declared for the half-year to December 31, with additional dividend at the rate of 1 per cent. per annum for same period.

Guest, Keen, and Nettlefolds, Limited.—The directors have declared an interim dividend for the six months ended December 31, 1913, at the rate of 5 per cent. per annum on the preference shares, and 10 per cent. per annum on the ordinary shares, both free of income tax.

Llandudno and Colwyn Bay Electric Railway.—Accounts for year to November 30 show available balance of £9,021, including £1,258 brought forward, and after providing for debenture service, directors recommend dividend of 4 per cent., compared with 3½ per cent. previous year; £919 forward.

Yorkshire (West Riding) Tramways Company.—The net income for 1913 was £27,312; 4 per cent. has been paid on preference stock, £5,000 added to general reserve (making it £35,000), £2,900 to depreciation, etc., and £5,988 written off preliminary expenses (extinguishing that item); £5,521 forward.

Lanarkshire Tramways Company.—The net profits for the past year, including £7,093 brought forward, were £24,660 after placing £11,000 to reserve for depreciation. A final dividend at the rate of 6½ per cent. per annum is proposed, making 6¼ per cent. for the 12 months, and leaving £1,990 to be carried forward.

Torquay Tramways Company.—The annual report shows a profit of £15,782. After deducting charges for debentures and adding the balance forward there remains £9,819. The directors recommend a dividend of 5 per cent., carrying forward £881. The number of passengers was 4,832,684, compared with 4,207,619 in 1912

Liverpool Overhead Railway.—This company have declared a final dividend at the rate of 3½ per cent. on the ordinary shares, making 3 per cent. for the past year. The ordinary shares received 2¼ per cent. for 1912, 1½ per cent. for 1911, and ¾ per cent. for 1910, but the dividend on the 5 per cent. preference shares only was paid for 1909.

£4,000,000 Loan for Moscow.—Tramway extensions are included among the objects for which Moscow City Council will shortly seek to raise a £4,000,000 loan. Municipal waterworks, gasworks, tramways, and pawnshops, showed in 1908 a net profit of 1·88 per cent. on the capital invested in these enterprises. In 1912 these profits had risen to 3·8 per cent.

The London General Omnibus Company, Limited.—The directors have recommended the following dividend: On the ordinary shares for the six months ended December 31, 1913, at the rate of £10 per cent., making with the interim dividend of £8 per cent. paid for the first half of the year, a dividend for the year 1913 of £18 per cent., with £175,000 placed to reserve and £34,197 carried forward.

Costa Rica Electric Light and Traction Company.—The net surplus profit for the year is £7,337 (against £5,732 last year), and the directors propose to carry the whole to the credit of discount and commission on debenture issues account. The power plant at El Brazil, inaugurated in December, 1911, has worked throughout the year without a hitch. The machinery for the fourth 500 KW. set is on order, and delivery is expected early.

Liverpool Tramway Profits.—The Tramways and Electric Power and Lighting Committee, of which Alderman Fred Smith is chairman, have decided to recommend the Council to place the sum of £125,000 towards the reduction of the rates, namely, £100,000 from the tramways and £25,000 from the electric light department. Last year the rates received from the tramways £66,000, and from the electric light supply £30,000. The additional relief received this year will amount to nearly 1¼d. in the £.

Appeal Against Reduction of London Tramway Assessments.—In the Court of Appeal, on January 21, the hearing was concluded of the arguments on the appeal of the Islington Assessment Committee against a decision of a Divisional Court, making absolute a rule *nisi* for a mandamus directing the appellants to appoint a valuer to make a provisional list showing the reduction in the rateable value of the London County Council tramways within the borough of Islington, due to the competition of motor omnibuses. Their lordships reserved judgment.

Manx Electric Railway.—Sir A. G. Boscawen, M.P., in moving the adoption of the report at the annual meeting, congratulated the shareholders on a record year, due to a great extent to the fine summer. Passenger receipts amounted to £36,642, as against £30,290 in 1912 and £32,545 in 1911, which latter was the previous best year. Goods, live stock, quarries, and sundries brought in £3,518, as against £4,082 in 1912, and £3,468 in 1911. The working expenses were £18,740, as against £17,669. Fuel was very much more expensive, and owing to the dry summer they had to run on steam to a greater extent than the year before. In spite of these adverse circumstances the ratio of working expenses to receipts was as low as 46·66 per cent., as against 51·4 per cent. in 1912, and 47·78 per cent. in 1911. After providing for the debenture interest and the interim dividends of the preference shares, they were left with a balance of £9,700, which they proposed to allocate as follows: To the balance of the preference shares dividend, £3,580; reserve for special renewals, £2,000; dividend at the rate of 2 per cent. on the ordinary shares, £2,000; and to carry forward £2,179.

Dublin United Tramways.—Reference is made in the directors' report for the year ended December 31, 1913, to a strike of the motormen and conductors that was attempted on August 26 last, the first day of the Dublin Horse Show, but was frustrated by the loyalty of the large majority of the company's staff. The restricted service of cars which for a time became necessary, and the general disorganisation of the business of the city, owing to strikes, during the last four months of the year, had a serious effect on the receipts. In the circumstances, the rate of dividend is reduced from 6 to 5 per cent. after setting aside £7,000 towards renewal of permanent way, and £3,000 towards renewal of cars. The accounts show that the amount available for division is £88,040. *Ad interim* dividends, amounting to £35,595, were paid on August 1, leaving £52,445 now available. The dividends and sums set aside will absorb £42,487, leaving £9,958 to be carried forward. The total receipts amounted to £297,731, and the expenses to £177,859, the balance to net revenue being £119,872. The number of passengers carried was 53,907,845. The company now own 54 miles 15 chains of line, aud the total mileage of passenger and other cars was 7,175,852. Energy consumption amounted to 11,671,048 units.

ALCOHOL MOTOR FUEL COMMITTEE.

The Alcohol Motor Fuel Committee, formed by the Imperial Motor Transport Council in accordance with the desire of the delegates who attended the Imperial Motor Transport Conference in July last, have entered upon the preliminary investigations connected with their task. It is the intention of the committee to investigate the possibility of obtaining adequate supplies of alcohol suitable for motor fuel at sufficiently low prices; also, to direct experiments tending towards the production of engines suited to employ alcohol as a fuel. The Hon. Arthur Stanley, M.P., chairman of the Royal Automobile Club, is chairman of the committee, and the other members are Mr. Thomas L. Aveling, Mr. B. Blount, Mr. J. S. Critchley, Mr. S. F. Edge, Mr. S. Glover, Dr. H. S. Hele-Shaw, Mr. Basil H. Joy, Professor V. B. Lewes, Dr. W. R. Ormandy, Sir Boverton Redwood, Bart., Mr. Sidney Straker, Mr. T. Tyrer, and Mr. Horace Wyatt (hon. secretary).

New Suburban Tramways for Melbourne.—The Victorian Parliament passed four bills for the construction of electric tramways round Melbourne, viz., the Brunswick and Coburg, the S Melbourne (Middle Park), the Camberwell, Hawthorn, and Richmond, and the Kew lines, at an estimated cost of £36,000, £60,000, £63,000, and £70,000 respectively.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Year Ended.	Electric Traction Inaugurated.	System.	Line open (single track).	Borrowing Powers.	Borrowing Powers Exercised.	Unexhausted Borrowing Powers.	Total Capital Expenditure.	Capital Expenditure per Mile of Single Track.	Loans Outstanding.	Loans Repaid and Sinking Fund.	Depreciation, Renewal and Reserve Funds.	Gross Receipts. Traffic.	Other.	Total.
				Mls. Chs.											
Aberdeen	May 31, 1913	Dec., 1899	E.	27 66	350,000	..	...	350,590	12,599	192,660	157,929	143,468	79,125	1,041	80,166
Accrington	Mar. 31, 1913	Aug., 1907	,,	10 53	169,675	134,670	35,800	134,525	12,619	116,976	17,694	13,200	27,419	403	27,822
Ashton-u-Lyne	Mar. 25, 1913	Aug., 1902	,,	8 15	130,070	108,099	21,971	108,099	13,203	83,240	24,859	1,650	21,340	551	21,891
Ayr	May 15, 1913	Sept., 1901	,,	7 49	...	...	...	85,445	11,224	78,935	18,044	14,918	15,626	670	16,296
Birmingham	Mar. 31, 1913	Jan., 1904	,,	108 32	2,302,001	2,089,194	212,807	1,981,588	18,280	1,874,109	215,084	220,369	574,248	7,318	581,566
Blackburn	Mar. 25, 1913	Mar., 1899	,,	24 63	408,174	342,474	65,700	334,924	13,512	254,600	167,381	1,000	63,440	3,243	66,683
Blackpool	Mar. 31, 1913	June, 1899	,,	21 31	453,798	301,796	152,002	301,796	14,115	301,796	114,086	15,126	73,155	1,011	74,166
Bolton	Mar. 31, 1913	Dec., 1899	,,	47 17	552,208	551,019	1,189	559,107	11,842	338,439	162,580	55,901	135,149	1,313	136,462
Bradford	Mar. 31 1913	July, 1898	,,	(h)103 69	1,269,568	982,398	287,170	1,092,566	9,653	607,928	388,335	89,072	280,758	18,345	299,103
Brighton	Mar. 31, 1913	Nov., 1901	,,	17 15	358,620	279,000	80,715	277,914	16,170	223,556	55,653	6,708	51,780	2,018	53,798
Burnley	Mar. 31. 1913	Dec., 1901	,,	22 13	388,052	339,125	48,927	231,601	10,450	179,498	56,652	48,212	79,641	249	79,890
Burton-on-Trent	Mar. 31, 1913	Aug., 1903	,,	9 60	108,632	104,562	4,070	106,225	10,895	50,583	53,979	8,966	14,383	1,304	15,687
Bury	Mar. 31. 1913	June, 1903	,,	21 14	407,800	280,775	127,025	283,005	13,365	262,135	42,877	(l)24,571	67,370	284	67,654
				(b)13 21											
Chester	Mar. 25, 1913	April, 1903	,,	6 35	92,991	82,380	10,611	82,934	12,883	69,727	12,785	2,968	12,272	458	12,730
Chesterfield	Mar. 31. 1913	Dec., 1904	,,	5 8	95,000	70,500	24,500	69,575	13,642	58,510	11,990	5,031	12,220	474	12,694
Colchester	Mar. 31, 1913	July, 1904	,,	7 75	70,748	69,555	1,193	69,401	8,743	53,425	17,049	Nil.	10,281	477	10,758
Croydon	Mar. 31, 1913	June, 1906	,,	19 10	287,689	287,689	Nil	284,847	14,894	230,968	87,264	42,453	90,543	1,921	92,464
Darlington	Mar. 31, 1913	June, 1904	,,	8 71	107,500	76,263	31,237	76,322	8,587	56,888	19,434	5,726	11,842	334	12,176
Darwen	Mar. 31. 1913	Oct., 1900	,,	7 13	93,400	86,300	7,100	86,300	12,048	57,330	28,280	7,450	14,244	1,176	15,420
Derby	Mar. 31. 1913	July, 1904	E.	22 5	...	...	...	242,785	11,004	157,213	85,572	(a)4,486	E 46,820	1,030	47,850
			H.		...	...	...	...	...	...	...	...	H 394	22	416
Doncaster	Mar. 31, 1913	June, 1902	E.	12 42	...	...	..	99,172	7,918	80,400	14,741	780	19,928	334	20,262
Dundee	May 15, 1913	July, 1900	,,	27 38	(f)	345,450	...	352,663	12,835	262,038	83,411	71,823	63,395	1,650	65,045
East Ham	Mar. 31, 1913	June, 1901	,,	14 32	190,643	190,242	401	191,583	13,307	148,515	58,075	5,097	57,050	610	57,660
Exeter	Mar. 31, 1913	April, 1905	,,	7 0	106,000	86,111	19,889	86,111	12,301	69,376	17,209	5,915	16,748	Nil	16,748
Gloucester	Mar 31, 1913	April, 1904	,,	15 0	191,000	144,243	46,757	147,692	9,846	111,051	16,816	750	16,177	1,168	17,345
Halifax	Mar. 31, 1913	June, 1898	,,	54 70	449,263	412,876	36,387	414,246	7,549	299,480	105,948	27,379	104,947	1,026	105,973
Ilford	Mar. 31. 1913	Mar., 1903	,,	11 28	149,633	149,633	Nil	149,500	13,171	109,912	39,721	5,611	24,361	2,407	26,768
Ilkeston	Mar. 31. 1912	May, 1903	,,	4 24	64,214	47,000	15,074	47,936	11,148	42,600	11,919	350	6,533	156	6,689
Ipswich	Mar. 31. 1913	Nov., 1903	,,	14 70	116,471	114,300	2,171	114,838	7,720	98,858	16,305	8,180	22,575	829	23,404
Keighley	Mar. 31, 1913	Oct., 1904	,,	6 9	50,934	47,328	3,606	47,328	7,745	32,468	16,961	942	8,845	313	9,158
Kilmarnock	May 15. 1913	Dec., 1904	,,	5 47	65,000	52,625	12,375	53,191	9,519	44,766	7,379	4,017	8,543	248	8,791
Kirkcaldy	May 15, 1913	Feb., 1903	,,	8 45	213,000	96,748	116,252	96,749	11,025	80,333	16,415	4,161	15,712	494	16,206
Lancaster	Mar. 31. 1913	Jan., 1903	,,	4 65	60,000	51,550	8,450	43,432	9,022	36,200	13,838	3,000	5,437	143	5,580
Leith	May 15, 1913	Aug., 1905	,,	17 73	275,000	237,300	37,700	236,155	14,572	186,500	50,800	514	34,664	1,030	35,694
Leyton	Mar. 31, 1913	Dec., 1906	,,	18 40	306,427	306,371	56	295,376	15,966	249,165	48,876	3,445	68,809	1,558	70,367
Lincoln	Mar. 31, 1913	Nov., 1905	S.	2 77	98,519	44,947	53,572	44,992	15,187	42,893	9,862	(a) 1,600	6,717	128	6,845
Liverpool	Dec. 31, 1912	Nov., 1898	E.	119 0	...	...	...	2,015,193	16,934	1,245,282	1,012,873	430,509	631,071	13,103	644,174
Lowestoft	Sep. 30, 1912	July, 1903	,,	4 6	94,230	87,031	7,199	87,031	21,357	67,833	13,067	...	10,781	17	10,798
Maidstone	Mar. 31. 1913	July, 1904	,,	7 3	82,932	82,582	350	79,098	11,239	67,191	15,391	Nil.	9,761	535	10,296
Manchester	Mar. 31, 1913	June, 1901	,,	188 30	2,355,689	2,034,371	321,318	2,061,791	10,945	1,543,504	437,305	479,683	876,023	11,624	887,647
Nelson	Mar. 31. 1913	Feb., 1903	,,	3 69	38,000	37,832	168	37,832	9,795	30,118	7,714	...	10,240	51	10,291
Newport (Mon.)	Mar. 31, 1913	April, 1903	,,	14 28	219,250	196,250	23,000	193,191	13,463	164,763	31,487	9,095	37,555	995	38,550
Nottingham	Mar. 31, 1913	Jan., 1901	,,	37 40	730,300	725,945	4,355	638,005	17,479	426,818	217,041	64,242	161,746	2,404	167,160
Oldham	Mar. 25, 1913	May, 1902	,,	28 6	516,923	440,204	76,719	442,174	15,750	320,725	118,217	2,135	108,003	2,574	110,577
				(b) 8 31											
Perth	May 15, 1913	Nov., 1905	,,	6 60	90,000	78,350	11,650	78,629	11,649	63,340	15,489	1,673	8,761	509	9,270
Plymouth	Mar. 31, 1913	Sept., 1899	,,	15 0	...	189,512	...	219,417	14,628	90,925	37,826	17,550	37,925	1,123	39,048
Pontypridd	Mar. 31. 1912	Mar., 1905	,,	8 48	136,019	135,885	134	136,896	15,919	112,862	22,899	...	21,130	2,036	23,166
Rawtenstall	Mar. 31, 1913	May, 1909	,,	15 71	193,290	181,526	11,764	181,776	14,442	162,451	19,075	3,177	25,410	1,126	26,536
Rochdale	Mar. 31. 1913	May. 1902	,,	(i)40 2	356,991	347,782	9,209	353,066	15,401	347,782	83,475	5,904	80,058	287	80,345
Rotherham	Mar. 31, 1913	Jan., 1903	,,	12 2	...	...	...	162,504	13,542	144,850	27,250	21,203	40,232	26	40,258
			R.T	...	...	...	...	...	...	...	...	...	2,457	Nil	2,457
Salford	Mar. 31. 1913	Oct., 1901	E.	75 64	1,050,666	723,669	326,997	723,672	9,599	536,791	258,977	45,699	260,365	486	260,851
Southampton	Mar. 31. 1913	Jan., 1900	,,	18 35	276,755	252,164	24,591	255,154	13,974	170,637	79,732	12,595	64,186	2,348	66,534
Southend-on-Sea	Mar. 31. 1913	July, 1901	,,	11 49	130,000	129,961	39	143,808	12,384	116,940	12,784	3,045	34,453	465	34,918
Southport	Mar. 31 1913	July, 1900	,,	(d) 10 63	292,000	196,500	95,500	118,708	11,004	153,530	42,970	442	16,928	386	17,314
South Shields	Mar. 31, 1913	Mar., 1906	,,	10 21	251,883	174,936	76,947	172,476	16,806	150,228	30,818	20,838	33,654	498	34,152
Staly'ge.H.,M.,D.	Mar 31.1913	May, 1904	,,	27 57	325,270	274,990	44,280	279,778	10,096	224,700	56,290	500	34,961	677	35,638
Stockport	Mar. 31. 1912	Aug., 1902	,,	27 50	305,028	234,500	70,528	238,199	8,623	176,002	58,498	54,219	59,594	1,215	60,839
Sunderland	Mar. 31. 1913	Aug., 1900	,,	20 28	308,699	303,211	5,488	305,234	14,999	182,318	111,943	31,883	68,507	364	68,871
Wallasey	Mar. 31, 1913	Mar., 1902	,,	19 69	198,167	195,290	2,877	215,424	10,846	167,924	58,733	11,927	57,458	564	58,022
Walsall	Dec. 31. 1912	Dec., 1902	,,	19 44	188,145	188,100	45	183,351	9,378	156,161	31,939	30,879	30,629	800	31,429
Walthamstow	Mar 31, 1913	June, 1905	,,	12 42	198,000	180,000	18,000	173,241	13,851	160,982	19,018	4,687	37,191	785	37,976
Warrington	Mar. 31. 1913	April, 1902	,,	9 52	103,674	102,896	778	102,128	10,583	73,830	29,068	10,000	22,903	302	23,205
West Ham	Mar. 31, 1913	Feb., 1904	,,	30 4	563,478	551,463	12,015	556,878	18,532	539,650	90,402	40,352	137,766	676	138,442
Wigan	Mar. 31. 1913	April, 1901	,,	(k) 34 42	...	...	...	...	...	...	...	...	71,268	1,515	72,783
Wolverhampton	Mar. 31, 1913	April, 1902	S.	21 40	279,733	265,616	14,117	278,615	12,959	217,882	47,734	50,220	53,963	797	54,760
Yarmouth (Gt.)	Mar. 31, 1913	June, 1902	E.	14 32	144,500	119,750	24,750	121,899	8,465	111,450	22,737	6,070	23,625	508	24,133

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast	Mar. 31, 1913	Nov., 1905	E.	98 54	1,567,674	1,386,232	181,442	1,389,713	14,037	1,381,200	144,342	117,769	250,589	3,788	254,377
Bexley	Mar. 31, 1912	Oct., 1903	,,	6 42	99,942	96,984	2,958	96,924	14,854	78,800	18,184	(j)1,074	13,826	1,542	15,368
Birkenhead	Mar. 31. 1913	Feb., 1901	,,	24 7	375,848	364,854	10,994	366,610	15,220	247,012	117,863	18,070	61,202	4,365	65,567
Bournemouth	Mar. 31. 1913	July, 1902	,,	(e)29 62	449,027	...	...	435,788	19,500	221,797	134,815	13,733	95,695	317	96,012
Cardiff	Mar. 31, 1913	May, 1902	,,	31 66	818,573	787,292	19,564	783,270	24,612	542,488	244,803	92,968	129,265	21,361	150,626
Coventry	Mar. 31 1913	Jan., 1912	,,	15 40	220,538	216,436	4,102	211,298	13,632	216,436	3,287	2,876	38,996	157	39,153
Glasgow	May 31, 1913	Oct., 1898	,,	193 47	3,714,266	3,553,584	160,682	3,694,143	18,595	2,479,408	1,074,177	2,079,645	1,007,653	3,891	1,011,544
				(b) 2 52											
Huddersfield	Mar. 31. 1913	Feb., 1901	,,	46 0	646,284	407,142	239,142	417,408	9,074	255,177	161,349	19,132	106,586	3,123	109,709
Hull	Mar. 31. 1913	July, 1899	,,	30 44	677,673	541,871	135,802	542,371	17,753	527,641	147,925	125,407	157,048	1,393	158,441
Leeds	Mar. 31, 19 3	Aug., 1897	,,	112 62	1,603,455	1,546,422	57,033	1,511,588	13,506	1,220,041	482,698	4,637	407,552	3,979	411,531
Leicester	Dec. 31. 1912	May, 1904	,,	37 0	739,240	719,223	20,017	722,021	19,514	607,476	129,211	100,000	134,966	12,705	147,671
London	Mar. 31, 1913	...	H.	15 70	...	...	...	...	...	...	...	...	37,544	879	38,423
		May. 1903	C.E	272 40	(c)	(c)	(c)	12,268,035	...	11,734,060	2,515,747	906,796	2,143,559	69,748	2,213,307
N'castle-on-Tyne	Mar. 31. 1913	Dec , 1901	E.	61 0	1,522,010	1,251,047	270,963	1,234,080	20,230	939,120	383,921	119,407	228,091	10,114	238,205
Northampton	Mar. 31. 1913	July, 1904	,,	9 13	239,800	127,255	112,545	135,481	14,786	91,176	36,078	10,499	27,250	899	28,149
Portsmouth	Mar 31. 1913	Sep.. 1901	,,	30 66	662,280	698,319	..	712,792	23,118	647,489	234,258	94,934	108,087	1,745	109,832
Preston	Mar. 31, 1913	June, 1904	,,	17 16	224,102	187,270	36,832	187,269	10,888	119,790	42,091	36,841	42,964	306	43,270
Reading	Mar. 31. 1913	July, 1903	,,	13 14	235,000	234,000	1,000	229,372	17,409	169,642	59,896	17,831	32,984	1,030	34,014
Sheffield	Mar 25. 1913	Sep.. 1899	,,	77 67	1,727,596	1,413,980	313,616	1,411,959	18,140	1,067,897	418,292	27,521	358,656	3,189	361,845
Wellington, N.Z.	Mar. 31. 1913	...	,,	30 7	496,423	496,423	Nil	606,771	20,165	496,423	39,486	109,066	149,446	826	150,272

C—Electric conduit system. E—Electric trolley system. H—Horse lines RT—Railless trolley system. S—Surface contact system.
(a) Accident insurance fund. (b) Additional lines leased and worked. (c) Conferred by Annual Money Act, which limits amount for each financial year. Powers not exercised are lapsed (d) Not including 8 m. 78 ch. leased lines. (f) Unlimited. (h) Includes 1¼ miles railless trolley route. (i) 17 mi. 8 chn. single track leased.
(j) Including £574 accident insurance fund. (k) Not including 10 miles 3 chains single track lines leased. (l) Including Insurance.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Working Expenses.					Gross Profit on Working.	Additions to Gross Profit	Deductions from Gross Profit.					Net Surplus + or Deficit −
	Traffic.	General.	Repairs & Maintenance.	Power.	Total.			Interest.	Sinking Fund.	Income Tax.	Depreciation & Renewal	Sundries.	Total.	
Aberdeen	20,710	9,404	5,954	7,138	43,206	36,960	472	6,839	4,661	...	13,407	...	24,907	+ 12,525
Accrington	6,839	1,870	2,102	4,644	15,455	12,367	...	4,000	3,693	127	...	...	7,820	+ 4,553
Ashton-und'r-Lyne	4,699	1,964	2,358	3,225	11,997	9,894	...	2,814	3,536	440	750	†1,004	8,544	+ 1,350
Ayr	3,486	1,964	1,604	1,989	9,043	7,253	...	1,972	1,943	122	2,041	...	6,078	+ 1,175
Birmingham	160,277	40,898	68,278	100,726	370,179	211,387	11,479	65,672	49,946	...	...	5,896	121,514	+ 101,352
Blackburn	14,863	4,262	12,392	10,999	42,516	24,167	110	5,292	14,909	206	...	...	20,407	+ 3,870
Blackpool	15,992	5,132	9,286	9,272	39,682	34,484	...	(h)9,184	6,969	...	8,000	...	24,153	+ 10,331
Bolton	29,821	8,646	15,984	19,767	74,213	62,244	1,114	h 11,189	17,197	1,095	18,715	219	48,415	+ 14,943
Bradford	83,763	24,458	46,061	46,271	200,553	98,550	4,045	20,735	31,926	3,653	32,921	4,360	93,595	+ 9,000
Brighton	14,309	4,028	12,853	8,316	39,506	14,232	27	7,800	5,560	...	27	...	13,360	+ 932
Burnley	18,718	5,306	9,525	15,881	49,430	30,460	...	5,662	6,491	893	...	(f)2,873	15,919	+ 14,541
Burton-on-Trent	5,111	1,322	2,903	2,998	12,334	3,353	...	1,406	1,418	...	1,500	...	4,324	− 971
Bury	14,761	4,349	6,633	8,026	33,769	33,885	337	h)7,974	4,824	244	...	(w)11,608	24,650	+ 9,572
Chester	3,349	1,574	878	2,203	8,004	4,726	93	(h)2,761	1,018	..	1,040	...	4,819	...
Chesterfield	2,739	1,230	1,912	2,110	7,991	4,703	253	2,287	1,849	...	...	...	4,136	+ 820
Colchester	2,825	1,189	1,771	2,508	8,293	2,465	48	(h) 2,159	2,319	...	...	...	4,478	− 1,965
Croydon	29,571	6,806	13,300	16,541	66,218	26,246	907	7,994	7,428	1,145	...	...	16,567	+ 10,586
Darlington	4,192	754	1,912	1,945	8,811	3,365	102	2,010	1,966	105	404	59	4,544	− 1,077
Darwen	3,594	831	3,096	2,395	9,916	5,504	141	2,298	2,191	...	1,050	...	5,539	+ 106
Derby	E 16,388 H 631	2,621	4,768 73	8,200	31,977 704	15,873 def. 288	547	6,388	3,363	...	310	(l) 300	10,361	+ 6,059
Doncaster	4,364	1,156	4,698	3,561	13,779	6,483	84	2,876	1,737	...	664	...	5,277	+ 1,290
Dundee	16,477	5,607	7,122	10,216	39,422	25,623	...	8,606	6,020	233	9,254	...	24,113	+ 1,510
East Ham	17,280	6,330	11,722	10,072	45,404	12,256	...	(h) 5,806	6,725	...	...	454	12,985	− 729
Exeter	4,511	1,175	1,311	3,499	10,496	6,252	...	(h) 2,347	1,814	48	...	...	4,209	+ 2,043
Gloucester	6,891	1,687	3,290	1,914	13,782	3,563	...	(h)4,502	2,772	...	750	...	8,024	− 4,461
Halifax	27,116	8,306	15,263	18,976	69,661	36,312	51	10,159	10,562	...	6,701	1,760	29,182	+ 7,181
Ilford	9,482	2,424	4,116	4,279	20,301	6,467	557	4,894	4,146	...	...	...	9,040	− 2,016
Ilkeston	2,359	579	1,613	1,476	6,027	662	157	1,578	1,644	..	...	210	3,432	− 2,613
Ipswich	8,072	1,827	4,015	3,502	17,416	5,988	...	(h) 3,642	2,078	...	...	...	5,720	+ 268
Keighley	2,692	768	899	1,612	5,971	3,187	179	1,116	1,881	...	...	(n) 369	3,366	...
Kilmarnock	2,921	599	800	1,633	5,953	2,838	...	(h)1,623	1,233	3	1,160	28	4,047	− 1,209
Kirkcaldy	4,728	1,158	1,525	2,636	10,047	6,159	...	2,660	1,608	...	410	110	4,788	+ 1,370
Lancaster	2,237	474	872	1,621	5,204	376	80	1,243	1,467	...	...	...	2,710	− 2,254
Leith	9,204	2,631	4,213	3,468	19,516	16,178	272	(h)6,343	7,750	13	...	70	14,176	+ 2,274
Leyton	(p)21,929	6,544	11,592	12,875	52,940	17,427	133	10,048	8,064	...	...	228	18,340	− 780
Lincoln	1,478	625	989	925	4,017	2,828	153	1,529	1,071	...	...	...	2,600	+ 381
Liverpool	167,045	58,771	80,184	113,893	419,893	224,281	24,045	50,096	59,155	...	(d)66,929	e) 5,217	181,397	+ 66,929
Lowestoft	3,285	796	2,115	2,813	9,009	1,789	..	h) 2,261	1,562	...	...	350	4,173	− 2,384
Maidstone	2,405	1,018	1,469	1,903	6,795	3,501	58	2,687	2,243	...	...	32	4,962	− 1,403
Manchester	255,604	83,574	84,879	133,681	557,738	329,909	14,282	55,771	52,394	8,613	96,351	(e)31,062	244,191	+ 100,000
Nelson	2,425	677	1,320	2,006	6,428	3,863	...	1,008	966	...	...	...	1,974	+ 1,899
Newport (Mon.)	10,254	4,009	10,364	7,014	31,671	6,879	808	5,817	4,197	...	...	...	10,014	− 2,327
Nottingham	43,601	15,142	18,684	30,847	108,274	58,886	...	14,349	19,762	...	...	...	34,111	+ 24,775
Oldham	25,759	7,792	18,416	21,470	73,437	37,140	1,474	15,796	11,822	1,099	...	(g) 7,762	36,479	+ 2,135
Perth	3,182	698	418	1,252	5,550	3,720	50	1,523	1,632	3	612	...	3,770	...
Plymouth	8,031	4,161	4,322	7,905	24,419	14,629	1,257	4,793	3,932	...	4,465	...	13,130	+ 2,696
Pontypridd	5,307	1,469	6,611	3,656	17,043	6,123	5	(h)4,293	4,034	...	590	41	8,958	− 2,830
Rawtenstall	5,415	2,133	3,445	4,113	15,106	11,430	(q) 1,612	5,947	6,113	...	...	...	12,060	+ 962
Rochdale	18,354	4,363	8,535	10,746	41,998	38,347	7,594	11,454	9,594	700	1,382	(z)9,483	32,613	+ 13,328
Rotherham	E 9,212 RT 557	2,778 273	5,711 633	8,591 369	26,292 1,832	13,966 625	...	4,918 73	3,261	...	5,037	...	13,216 73	+ 750 + 553
Salford	73,745	17,785	22,183	47,371	161,084	99,767	5,659	18,749	21,887	2,522	12,867	(k)27,401	83,426	+ 22,000
Southampton	19,408	5,269	10,092	12,280	47,049	19,485	9,151	7,290	7,241	565	5,000	1,422	21,518	+ 7,118
Southend-on-Sea	8,046	2,260	3,534	6,187	20,027	14,891	4,228	(h 3,834	1,753	...	4,017	...	9,605	+ 9,514
Southport	4,428	2,140	2,662	3,263	12,493	4,821	6,362	6,513	5,017	...	1,977	628	14,135	− 2,952
South Shields	7,929	3,263	2,659	5,370	19,221	14,931	313	(h) 5,488	3,438	...	...	...	8,926	+ 6,318
Staly'dge,H.,M.,D.	12,148	4,018	6,273	6,445	28,884	6,754	...	(h) 7,711	7,308	...	327	532	15,878	− 9,124
Stockport	12,436	3,717	6,437	4,781	27,371	33,468	1,326	5,978	8,365	910	6,795	3,208	25,254	+ 9,540
Sunderland	18,431	4,552	4,670	11,268	38,921	29,950	252	(h) 7,228	10,366	476	7,132	...	25,202	+ 5,000
Wallasey	17,249	4,326	5,695	10,660	37,930	20,092	316	5,522	4,559	...	634	...	10,715	+ 9,693
Walsall	7,155	3,034	4,126	3,913	18,228	13,201	1,334	5,164	3,577	415	368	1,119	10,643	+ 3,892
Walthamstow	14,731	2,646	6,717	8,175	32,269	5,707	210	(h) 6,085	2,698	...	...	...	8,783	− 2,866
Warrington	5,529	1,779	4,255	3,235	14,798	8,407	408	2,580	3,254	...	...	...	5,834	+ 2,981
West Ham	51,254	11,253	26,921	19,386	108,814	29,628	508	19,511	12,369	685	...	959	33,524	− 3,388
Wigan	...	...	...	...	41,318	31,465	...	13,859	12,391	...	...	3,781	...	...
Wolverhampton	12,259	4,157	7,334	6,778	30,528	24,232	(x) 1,131	7,788	5,146	100	4,915	(a)3,637	21,586	+ 8,771
Yarmouth (Gt.)	7,443	1,867	2,634	4,388	16,332	7,801	95	(h) 4,094	2,740	...	...	...	6,834	+ 1,063

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast	73,836	13,642	32,519	23,887	143,884	110,492	1,363	45,900	24,541	2,023	13,000	1,628	87,092	+ 24,763
Bexley	(s) 5,465	984	1,892	920	9,261	6,107	...	2,942	2,325	...	500	...	5,767	+ 340
Birkenhead	16,099	4,011	10,380	9,371	39,861	25,706	86	(h)11,537	9,501	269	4,302	183	25,792	...
Bournemouth	22,307	6,912	9,107	13,967	52,293	43,719	723	10,733	15,371	...	...	(r) 8,017	34,121	+ 10,321
Cardiff	37,582	(c)11,176	15,351	20,184	84,293	66,333	1,732	24,138	22,801	800	6,946	...	54,685	+ 13,380
Coventry	10,112	4,289	6,952	2,765	24,118	15,035	2,950	10,379	6,163	...	1,258	...	17,800	+ 185
Glasgow	305,400	122,812	142,988	48,147	619,347	392,197	58,631	81,774	97,077	13,388	215,757	9,829	417,825	+ 33,003
Huddersfield	26,892	6,064	22,638	9,933	65,527	44,182	61	(h)11,749	10,904	1,630	..	...	24,283	+ 19,960
Hull	47,495	12,212	42,005	11,245	112,957	45,484	1,500	16,730	12,201	1,500	(u)3,118	...	33,549	+ 13,435
Leeds	109,413	36,055	39,894	28,455	213,817	197,714	7,511	42,197	49,923	5,021	41,752	4,957	143,850	+ 61,375
Leicester	47,876	9,447	22,023	15,633	95,029	52,642	2,512	23,252	12,095	1,939	7,668	...	44,954	+ 10,000
London	H 19,064 E 742,157	4,670 (r) 185,634	6,592 312,395	(m)22,122 220,042	52,448 1,460,228	def.14,025 753,079	... 33,397	342,645	388,042	28,188	497	(l)27,104	786,476	...
N'castle-on-Tyne	64,493	18,675	25,944	19,908	129,020	109,185	3,966	30,431	39,556	3,179	..	6,796	79,962	+ 33,189
Northampton	7,254	3,080	2,489	3,563	16,386	11,763	279	3,481	4,312	323	...	(b)1,226	9,342	+ 2,700
Portsmouth	28,918	10,200	7,877	5,231	52,226	57,606	8,831	20,875	17,462	964	8,412	350	48,063	+ 18,374
Preston	10,781	4,592	6,263	2,429	24,065	19,205	...	3,933	4,891	..	3,649	1,358	13,831	+ 5,374
Reading	8,837	3,702	3,648	3,358	19,545	14,469	...	6,714	4,662	291	...	...	11,667	+ 2,802
Sheffield	113,235	22,312	43,656	28,487	207,690	154,155	3,057	35,616	40,663	3,786	30,187	213	110,465	+ 46,748
Wellington, N.Z.	56,296	7,242	21,330	16,260	101,128	49,144	2,664	19,961	4,778	...	14,068	4,702	43,509	+ 8,299

(a) Includes £4,393 loss on motor omnibuses. (b) Includes £500 loss on omnibus account. (c) Includes £1,611 insurance fund. (d) Includes reserve.
(e) Includes rents for leased lines. (f) £2,061 rent of leased lines. (g) Includes rents of lines and deficit 1912. (h) Including income tax.
(k) Includes rents of lines. (l) Including loss on horse traction. (m) Horsing expenses. (n) Transferred to motor omnibus capital account.
(p) Includes £396 horse account. (q) Aid from rates £1,500. (r) Including special charges, £5,911. (s) Including £2,128 through-running expenses.
(u) District fund widening streets. (w) Amount apportioned to leased lines. (x) Includes £306 profit on motor char-a-banc.
(z) Includes £6,469 rent of leased lines. † This item includes £734 payable to Sinking Fund of Hurst U.D.C.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Appropriation of Net Surplus.			Receipts per Car Mile.		Operating Expenses per Car Mile.					Percentage of Operating Expenses to Total Revenue.	Average Operating Expenses per Car Mile (excluding Power Costs).	Board of Trade Units.		
	Carried Forward.	Reserve.	Contribution to Rates or Municip'l Funds.	Average Total per Car Mile.	Average Traffic per Car Mile.	Traffic.	General.	Repairs and Maintenance.	Power. (Price paid)	Total.			Units.	Cost per Unit.	Units used per car mile.
				d.	d.	d.	d.	d.	d.	d.	%	d.		d.	
Aberdeen ...	...	12,525	...	11·06	10·92	2·859	1·298	·822	·985	5·964	53·89	4·979	2,110,964	·81	1·21
Accrington ...	460	3,359	724	12·57	12·38	3·09	·84	·95	2·10	6·98	55·55	4·88	907,721	1·24	1·70
Ashton-u-Lyne ...	...	...	1,350	11·475	11·186	2·463	·899	1·236	1·691	6·289	54·801	4·598	619,289	1·25	1·353
Ayr...	...	1,175	...	10·13	9·713	2·16	1·23	·99	1·24	5·62	55	4·35	378,570	1·26	·98
Birmingham ...	...	45,000	56,352	10·62	10·492	2·929	·747	1·248	1·840	6·764	63·6	4·924	21,591,889	1·119	1·64
Blackburn ...	3,870	...	...	14·02	13·34	3·12	·90	2·61	2·31	8·94	58·84	6·63	2,030,535	1·3	1·81
Blackpool ...	...	2,667	7,664	16·93	16·71	3·64	1·17	2·12	2·12	9·05	53·50	6·95	1,400,209	1·587	1·33
Bolton	443	...	14,500	11·558	11·447	2·525	·733	1·354	1·674	6·286	54·915	4·612	4,315,448	1·1	1·52
Bradford	...	...	9,000	12·021	11·314	3·366	·983	1·859	1·860	8·068	67·051	5·687	11,126,989	1	1·663
Brighton	932	...	...	11·545	11·112	3·071	·864	2·758	1·785	8·478	73·43	6·693	1,653,126	1·2	1·49
Burnley	...	5,791	8,750	13·226	13·185	3·098	·878	1·577	2·630	8·133	61·85	5·55	3,079,155	1·214	2·11
Burton-on-Trent ...	...	...	...	8·61	7·90	2·81	·73	1·45	1·42	6·41	78·7	4·99	515,622	1·39	1·01
Bury	...	(b) 4,572	5,000	10·22	10·04	2·214	·685	1·152	1·290	5·341	49·91	4·051	2,039,011	1·081	1·541
Chester	...	...	...	8·81	8·50	2·32	1·09	·61	1·52	5·54	63	4·02	385,132	1·33	1·11
Chesterfield ...	...	820	...	10·51	10·12	2·27	1·02	1·58	1·75	6·62	62·9	4·87	405,096	1·25	1·59
Colchester ...	...	...	...	7·98	7·627	2·096	·882	1·313	1·86	6·151	76·74	4·291	401,208	1·5	1·21
Croydon	...	7,586	3,000	8·381	8·207	2·763	·637	1·224	1·499	6·123	70·91	4·497	2,484,993	1·604	·968
Darlington ...	...	...	...	7·651	7·441	2·633	·480	1·202	1·222	5·537	72·36	4·315	466,784	1	1·222
Darwen	106	...	...	14·218	14·204	3·771	·783	2·833	2·396	9·783	64·30	7·387	...	...	...
Derby	6,059	...	...	E 9·884	9·671	3·385	·541	·985	1·694	6·605	66·8	4·911	1,357,232	1·45	1·168
				H. 5·649	5·347	8·564	...	·994	...	9·558	169·4	...	...	...	...
Doncaster ...	...	1,290	...	9·41	9·25	2·03	·54	2·18	1·65	6·40	69·1	4·75	683,651	1·25	1·32
Dundee	...	10	1,500	11·480	11·189	2·908	·989	1·257	1·803	6·957	60·6	5·154	2,451,897	1	1 803
East Ham ...	...	...	...	10·06	9·95	3·02	1·10	2·04	1·76	7·92	78·8	6·16	2,139,401	1·125	1·55
Exeter	...	2,043	...	9·272	9·272	2·498	·650	·726	1·937	5·811	62·67	3·874	516,793	1·625	1·192
Gloucester ...	...	...	...	6·618	6·173	2·630	·644	1·255	·730	5·259	79	4·529	480,442	1	·73
Halifax	...	...	7,181	11·816	11·702	3·023	·926	1·702	2·116	7·767	65	5·65	3 900,912	1·125	1 81
Ilford	...	...	...	7·616	7·464	2·698	·689	1 171	1·218	5·776	76·4	4·558	960,846	1·07	1·098
Ilkeston	...	...	...	6·73	6·57	2·36	·58	1·63	1·49	6·06	90·25	4·57	339,920	1·012	1·4
Ipswich	268	...	...	8·408	8·110	2·900	·657	1·442	1·258	6·257	74·41	4·999	672,411	1 23	1 007
Keighley	...	...	...	9·064	8·754	2·664	·761	·890	1·595	5·910	65	4·315	251,636	1·5	1 05
Kilmarnock ...	...	...	...	7·09	6·89	2·357	·482	·646	1·317	4·802	66·3	3·487	313,500	1·25	1·06
Kirkcaldy ...	1,370	...	...	8·22	7·97	2·398	·587	·774	1·337	5·096	63·95	3·75	632,581	1	1 337
Lancaster ...	...	...	...	7·92	7·61	3·130	·664	1·221	2·269	7·284	91	5·015	228,202	1·7	1·33
Leith	2,274	...	...	9·07	8·81	2·34	·67	1·07	·88	4·96	54·67	4·08	899,191	·93	·95
Leyton	...	...	...	9·368	9·161	(c) 2·920	·871	1·543	1·714	7·048	73·092	5·374	2,911,345	1·037	1·615
Lincoln	381	...	...	10·24	10·05	2·21	·94	1·47	1·38	6·00	58·7	4·62	185,807	1·25	1·107
Liverpool ...	...	...	66,929	12·03	12·28	3·184	1·120	1·529	2·171	8·004	63·6	5·833	...	...	...
Lowestoft ...	...	...	...	8·3	8·3	2·5	·6	1·6	2·18	6·9	83·40	4·8	385,731	1·75	1 2
Maidstone ...	...	...	...	8·36	7·93	1·96	·82	1·19	1·55	5·52	69·58	3·97	365,300	1·25	1·236
Manchester ...	...	...	100,000	11·351	11·202	3·269	1·069	1·085	1·709	7·132	62·83	5·423	30,492,127	1·043	1 625
Nelson	1,889	...	...	12·29	12·23	2·89	·81	1·58	2·39	7·67	62	5·28	240,804	2	1 2
Newport (Mon.)...	...	...	...	9·557	9·310	2·542	·994	1·570	1·746	7·852	82·26	6·105	1,239,245	1·28	1 28
Nottingham ...	...	5,775	19,000	11·50	11·34	3·00	1·05	1·29	2·11	7·45	64·19	5·31	5,761,096	1·25	1 68
Oldham	...	2,135	...	12·946	12·645	3·016	·912	2·156	2·514	8·598	66·41	6·084	3,435,211	1 49	1·675
Perth	...	...	...	8·79	8·31	3·02	·66	·39	1·19	5·26	59	4·07	277,474	1·08	1 09
Plymouth ...	...	...	2,696	11·790	11·094	2·349	1·217	1·264	2·312	7·142	62·53	4·830	1,139,761	1·667	1 33
Pontypridd ...	...	...	...	10·92	10·78	2·71	·75	3·37	1·87	8·70	80·65	6·83	701,941	1·25	1 49
Rawtenstall ...	...	982	...	11·49	11·01	2·35	·92	1·49	1·78	6·54	56·69	4·76	734,781	1·38	1·33
Rochdale... ...	7,423	5,904	...	11·019	10·980	2·524	·610	1·193	1·560	5·887	52·3	4·327	2,566,554	1·005	1 553
Rotherham ...	E. ...	...	750	12·50	12·50	2·86	·86	1·77	2·67	8·16	65·31	5·49	1,499,517	1·37	1 94
	R.T 552	...	...	10·36	10·36	2·35	1·15	2·66	1·56	7·72	74·56	6·16	64,500	1·375	1·13
Salford	...	...	22,000	10·692	10·673	3·023	·729	·909	1·942	6·603	62	4·661	9,200,898	1 227	1 000
Southampton ...	7,118	...	...	10·411	10·044	3·037	·825	1·579	1·921	7·362	71	5·441	2,000,301	1 5	1·31
Southend-on-Sea	2,514	1,000	6,000	13·14	12·97	3·03	·85	1·33	2·33	7·54	57·35	5·21	848,538	1·75	1 35
Southport ...	...	...	...	9·595	9·381	2·454	1·186	1·475	1·808	6·923	72·1	5·101	513,285	1·5	1 155
South Shields ...	(d) 500	4,218	1,600	10·066	9·919	2·253	·885	·729	1·566	5·433	56·28	4·077	914,188	1·407	1 122
Stalybridge, &c.	...	...	...	7·880	7·729	2·686	·887	1·387	1·425	6·385	81·33	4·960	1,719,666	9	1·584
Stockport ...	...	540	9,000	10·434	10·221	2·133	·638	1·103	·820	4·694	44·99	3·874	1,701,943	1·036	1·218
Sunderland ...	...	...	5,000	11·208	11·149	2·999	·741	·760	1·834	6·334	56·81	4·50	1,764,971	1·5	1 19
Wallasey ...	...	2,500	7,500	11·035	10·928	3·280	·823	1·033	2·028	7·214	65·3	5·18	1,827,115	1·4	1·45
Walsall	3,392	...	500	11·326	11·038	2·578	1·094	1·487	1·410	6·569	58	5·159	780,825	1 23	1·172
Walthamstow ...	...	...	...	7·92	7·76	3·07	·55	1·40	1·71	6·73	84·97	5·02	1,426,964	1 375	1·24
Warrington ...	1,481	...	1,500	12·398	12·237	2·954	·950	2·275	1·728	7·906	64 611	6·177	517,587	1·50	1 152
West Ham ...	...	...	...	9·43	9·329	3·554	·761	1·823	1·313	7·451	78	6·038	6,103,884	·75	1·72
Wigan	...	...	...	12·05	11 80	...	...	...	...	6 84	56·77	5·00	2,132,384	...	1·471
Wolverhampton ...	...	...	3,777	11·250	11·086	2·518	·854	1·507	1·393	6·272	55·75	4·879	1,620,970	1	1·388
Yarmouth (Gt.) ...	1,062	...	...	8·605	8·425	2·655	·666	·938	1·564	5·823	67·93	4·259	655,315	1·60	·974

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

									*					Works Cost.	
Belfast	...	...	24,763	10·27	10·12	2·98	·55	1·31	·96	5·80	56·33	4·83	9,733,420	·589	1·40
Bexley	40	...	...	12·8	12·63	3·04	·89	1·75	·87	6·55	60·3	5·68	350,103	·63	1·37
Birkenhead ...	...	...	...	12·075	11·89	3·128	·779	2·016	1·141	7·064	58 49	5·923	2,490,715	·565	2·016
Bournemouth ...	...	10,321	...	12·24	12 20	2·85	·88	1·16	(b) 1·78	6·67	54·46	4·80	2,917,309	·563	1·55
Cardiff	3,980	...	9,400	12·014	11·83	3·449	1 026	1·409	·679	6·563	56	5·881	4,015,405	·438	1·54
Coventry ...	185	...	...	9·451	9·414	2·441	1·035	1·678	·668	5·822	61·8	5·154	1,533,212	·450	1·44
Glasgow	...	...	33,003	10·404	10·364	3·141	1·263	1·471	·495	6·370	57·88	5 875	32,280,346	·358	1·38
Huddersfield ...	...	13,370	6,590	11·04	10·73	2·70	·61	2·28	1·00	6·59	59·73	5·59	5,413,488	42	2·27
Hull	...	1,435	12,000	9·42	9·33	2·82	·68	2·46	·67	6·63	71·04	5·96	4,855,082	·67	1·31
Leeds	...	...	61,375	11·229	11·120	2·85	·984	1·089	·776	5·834	51·95	5·058	16,461,894	·440	1·807
Leicester	...	...	10,000	9·675	8·843	3·137	·622	1·443	1·024	6·226	64	5·202	6,558,800	·3615	1·79
London	...	...	...	H. 8·73	8·53	4·32	1·07	1·50	5·02	11·91	136·50	11·91	...	...	...
				E. 10·04	9·73	3·36	·84	1·42	1·00	6·62	65·97	5·62	138,714,732	·619	2·62
N'castle-on-Tyne	...	21,189	12,000	11·958	11·451	3·238	·937	1·302	1·000	6·477	52·57	5·477	9,426,563	·394	1·972
Northampton ...	500	1,200	1,000	10·55	10·21	2·72	1·15	·93	1·34	6·14	58	4·80	934,909	·91	1·46
Portsmouth ...	11,374	(f) 3,000	4,000	12·229	12·035	3·220	1·136	·877	·582	5·815	47·55	5·233	2,599,210	·543	1·206
Preston	...	5,374	...	10·698	10·50	2·665	1·135	1·550	·600	5·95	56·63	5·35	1,516,545	·384	1·309
Reading	...	2,802	...	8·920	8·650	2·319	·970	·957	·880	5·126	57	4·246	1,033,313	·78	·99
Sheffield	...	7,032	37,716	10·760	10·665	3·367	·664	1·298	·847	6·176	57·389	5·329	16,500,208	673	1·837
Wellington, N.Z.	8,299	...	...	15·654	15·568	5·864	·755	2·222	1·694	10·535	67·3	8·841	4,921,406	·80	2·13

* The figures given under "Power" in Table II. include actual works costs only. H—Horse lines. E—Electric trolley system. (b) Including ·88d. per car mile current supplied by Bournemouth and Poole Supply Company. (c) Horse account ·053d. (d) Accident, insurance, and compensation fund. (f) Insurance fund. (f) Including Insurance.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Population Served.	Traffic Records. Car Mileage.	Passengers Carried.	Passengers Carried per Car Mile.	Average Fare per Passenger. d	Average Journeys per Head of Populat'n per Annum.	Average Car Miles per Day per Car.	Traffic Revenue per Mile of Single Track. £	Average Traffic Revenue per Annum per Head of Populat'n Served.	Operating Expenses per Passenger. d.	Average Distance of 1d. Fare. Miles.	Average Fare Charged per Mile. d.	Average Speed per Hour. Miles.	Average Total Car Hours per Day.	Average Number of Cars in Use Daily.	Number of Cars in Stock.
Aberdeen ...	165.000	1,738,966	19,990,711	11·49	·95	121·15	105·8	2,930	9/6	·519	1·69	·6	7·5	655	45	77
Accrington...	70.000	531,356	4,577,019	8·6	1·43	65·3	105	2,572	7/10	·81	1·07	·929	7·5	242	17	27
Ashton-u-L.	50.000	457,856	4,754,139	10·383	1·077	95·083	104	2,606	8/6	·606	1·223	·81	8	204	12	21
Ayr	33.000	385,986	3,880,850	10·05	·96	117	106	2,079	9/6	·558	1·25	·75	8	140	10	20
Birmingham	est.850.000	13,134,642	134,467,166	10·23	1·025	158	81·06	5,298	13/6	·66	2·34	·366	7·5	5,063	485	511
Blackburn ...	200.000	1,141,161	11,721,367	10·88	1·27	58·61	105	2,564	6/4	·87	1·25	·76	7·50	434	31	61
Blackpool ...	67,500	1,050,115	12,452,820	12	1·41	184·48	89·6	4,321	21/8	·765	...	...	8	...	32	72
Bolton ...	221,000	2,831,003	30,287,673	10·69	1·065	137·04	121·66	2,875	12/3	·588	1·468	·627	7·25	1,030	60	106
Bradford ...	354,000	5,971,561	62,005,976	10·383	1·086	175	113	2,703	15/11	·776	1·63	·504	7·3	2,232	144	242
Brighton ...	132,265	1,118,309	11,312,855	10	1·09	85·55	82·83	3,012	7/11	·84	1·27	·788	6·41	544	34	50
Burnley ...	175.000	1,449,647	15,949,359	11	1·18	91	95	3,620	9/1	·744	1·25	·83	7	760	40	57
Burton ...	48.000	437,106	3,188,655	7·30	1·082	66	...	1,684	5/10	·928	1·505	·58	7·5	...	...	20
Bury	128,202	1,599,872	15,132,553	9	1·07	118·03	102·33	1,957	10/6	·535	1·24	·85	8·56	506·64	42·71	54
Chester ...	39.028	346,645	3,067,815	8·85	·96	78·6	95	1,906	6/4	·626	1·27	·8	7	150·60	10·04	18
Chesterfield	38,000	289,745	2,631,398	9·08	1·1	69	122	2,407	6/8	·728	1·38	·75	7·33	126	7	14
Colchester ...	44,160	323,524	1,871,866	5·79	1·32	42·39	89·3	1,295	4/8	1·06	·85	1·09	6·81	157·92	9·87	18
Croydon ...	170,451	2,657,824	20,504,143	7·74	1·06	120·29	125	4,734	10/7	·775	2·15	·50	7·92	915·82	58	75
Darlington...	58,000	381,920	3,791,835	9·9	·75	65·38	95·1	1,345	4/1	·557	1·219	·45	6·66	151·25	11	16
Darwen ...	40,611	252,710	2,755,011	10·91	1·24	67·83	...	1,989	7/-	·864	...	...	...	...	...	...
Derby ...	124,000	E 1,161,854	10,857,834	9·345	1·035	87·56	...	2,122	7/7	·707	1·44	·75	6·375	...	...	50
		H. 17,674	98,230	5·558	·962			...	...	1·36	1	1	..	...	...	3
Doncaster ...	52,000	516,840	5,072,172	9·81	·952	97·54	103	1,591	7/8	·652	1·25	·76	7·5	218	16	25
Dundee ...	165,000	1,359,821	17,734,162	13·04	·857	107	...	2,305	7/8	·533	2	·50	7·3	...	...	68
East Ham ...	130,000	1,375,433	17,775,698	12·92	·77	132	...	5,101	8/9	·61	1·80	·65	...	...	...	45
Exeter ...	48,660	433,507	4,110,513	9·48	·98	84·48	...	2,392	6/11	·612	1	1	6	...	16	20
Gloucester ...	53,972	628,946	4,200,432	6·7	·92	77	90·75	1,078	6/-	·78	1·5	·65	6·78	260·3	19	30
Halifax ...	176,000	2,152,391	19,456,923	9·04	1·27	110	79·5	1,912	11/11	·86	1·35	·84	6·8	814	74	95
Ilford ...	82,000	843,517	7,578,813	8·79	·831	92·42	...	2,312	5/1	·64	1·543	·69	8	...	...	26
Ilkeston ...	32,000	238,645	1,732,846	7·25	·9	54	117	1,713	6/1	·836	3·2	·35	7·5	108	7·5	13
Ipswich ...	75,300	668,025	5,554,585	8·31	·975	73·76	65·5	1,518	6/-	·75	1·53	·693	6·17	234·19	20·78	36
Keighley ...	43,000	212,500	3,099,272	12·8	·68	72·08	55·35	1,447	4/1	·462	2·22	·45	6·87	126	7	12
Kilmarnock ...	36,000	297,557	2,317,709	7·78	·879	64·38	90·05	1,537	4/8	·616	1·13	·86	7·22	112·58	9·05	14
Kirkcaldy ...	39,600	473,089	5,237,947	11·07	·719	132·27	59	1,786	7/11	·46	1·822	·64	7·5	195	15	22
Lancaster ...	41,414	171,475	1,461,104	8·52	·893	35	75	1,132	2/8	·854	1·71	·5	8	88·2	6·3	12
Leith ...	110,400	944,329	9,706,611	10·28	·87	87·92	125	1,926	6/3	·482	1·32	·72	8·3	311	20·66	37
Leyton ...	124,735	1,802,647	17,476,453	9·69	·945	140	112	3,719	11/-	·727	...	...	8	...	...	60
Lincoln ...	20,000	160,446	1,733,259	10·8	·92	86·66	64·08	2,264	6/8	·556	1·75	·428	7	90	5	8
Liverpool ...	...	12,590,408	134,249,967	10·66	1·128	...	...	5,303	...	·756	2·45	...	...	...	445	587
Lowestoft ...	35,000	308,897	2,462,188	8	1·05	70·35	...	2,646	6/2	·878	univ'rs'l penny fare		...	...	...	19
Maidstone ...	25,000	295,438	2,224,200	7·528	1·053	88·968	81	1,387	7/1	·73	1	1	6·7	128	12	19
Manchester	950,000	18,768,259	187,675,185	10	1·12	198	95·8	4,990	17/5	·713	2·368	·422	7·25	...	537	629
Nelson ...	45,000	200,996	2,776,785	13·82	·88	61·71	94·09	2,650	4/4	·555	1	1	8·50	108	6	11
Newport ...	87,626	968,067	9,251,181	9·56	·973	105·6	...	2,617	8/7	·821	1·75	...	...	...	37	44
Nottingham	260,000	3,485,789	38,484,032	11·04	1·02	148	92·08	4,514	12/8	·67	1·68	·65	6·86	...	104	135
Oldham ...	180,000	2,049,916	21,435,727	10·457	1·19	119·087	109·5	2,962	12/-	·822	1·115	·884	6·84	820	51·25	92
Perth ...	35,000	252,940	1,813,228	7·16	1·15	50·5	96·25	1,298	4/7	·73	..	...	6·25	120	8	12
Plymouth ...	112,000	820,406	8,839,974	10·77	1·029	78·92	...	2,528	6/9	·663	...	...	...	...	...	42
Pontypridd ...	40,000	470,215	4,721,110	10·04	1·07	118	83·4	2,457	10/7	·77	1·25	·81	6·5	234	18	26
Rawtenstall	50,000	553,813	4,943,775	8·93	1·23	98·72	126	1,600	10/2	·73	1·12	·88	9	198	12	24
Rochdale ...	130.000	1,749,967	13,740,152	7·91	1·38	105·7	114·90	2,008	12/4	·734	1·07	·90	7·66	645	43	69
Rotherham ..	64,000	E 772,610	8,774,539	11·35	1·104	137·12	...	3,352	12/7.	·719	..	...	...	...	...	...
	...	RT 56,887	191,088	3·36	3·08	...	...	...	...	2·3	..	...	...	...	...	...
Salford ...	350,000	5,854,830	50,113,120	8·559	1·243	143	111	3,425	14 10	·77	1·85	·55	7·853	2,075·18	144	200
Southampt'n	122,200	1,533,638	12,475,793	8·134	1·235	102	...	3,482	10·6	·90	...	...	...	...	...	70
Southend ...	78,000	637,366	7,581,104	11·89	1·09	97·2	87	4,708	8/10	·634	1·41	·76	6·5	357	21	31
Southport ...	31,312	433,068	4,401,336	10·63	·923	140·5	103	1,574	10/10	·68	1·6	·62	6·65	217·5	13·5	26
So'th Shields	110,513	814,212	8,456,688	10·386	·942	76·5	129·2	3,332	6/1	·545	1·825	·54	7·61	282	16	35
Stalybridge	92,933	1,085,545	8,896,836	8·123	·943	95·7	...	1,280	7/6	·779	1·275	·784	6·8	...	...	60
Stockport	120,000	1,399,314	10,665,098	7·6	1·341	88·8	76·6	2,158	9/11·3	·615	1·25	·72	7·5	465	38	50
Sunderland	170,000	1,474,637	16,972,537	11·5	·968	99·8	79·3	3,366	8/1	·550	1·34	·68	7	672	42	70
Wallasey ...	83,000	1,261,855	12,352,000	9·78	1·11	148·94	98·7	2,893	13/10	·99	1·89	·54	7	...	...	61
Walsall ...	100,000	665,964	5,683,798	8·535	1·293	87	57	1,750	6/1	·769	1·24	·77	7	315	21	39
Walth'mst'w	128,000	1,151,029	11,807,549	10·258	·756	91·89	93	2,968	5/11	·655	1·15	·89	7·2	408	36	38
Warrington	86,000	449,206	6,064,139	13·5	·906	70·513	102·533	2,372	5/4	·584	1·246	·803	6·408	192·048	12·003	21
West Ham	294,200	3,544,292	40,200,347	11·34	·822	136	98	4,592	9/4	·65	1·80	·56	7·66	1,262·25	99	118
Wigan ...	200,000	1,449,188	13,018,833	8·98	1·314	65·1	105·5	2,309	7/2	·761	1·15	...	7·4	...	42	67
Wolverh'ton	135.000	1,168,239	11,913,122	10·198	1·08	88·25	87	2,510	8/-	·615	1·18	·879	6·85	622·2	36·6	49
Yarmouth ...	55,800	673,027	4,514,871	6·7	1·256	80·91	73·7	1,687	8/6	·868	1·25	·76	7	375	25	35

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast ...	385,492	5,946,659	58,437,942	9·82	1·07	151	128	2,539	13/-	·592	1·96	·43	8·75	2,256	141	282
Bexley ...	16,000	262,658	2,130,189	8·11	1·56	133	...	2,360	18/11	·95	1·37	·62	7·5	...	8	16
Birkenhead	130,832	1,235,277	13,622,361	11·02	1·077	104·12	68·64	2,540	9/4	·702	1·39	·66	6·61	511·73	49·30	59
Bournem'uth	120,000	1,882,054	15,750,576	8·36	1·45	131	95	3,214	16/-	·796	1·19	·87	6·80	1,140	60	81
Cardiff ...	182,729	2,614,901	28,365,277	10·84	1·09	155	98·25	4,062	14/1	·713	1·44	·736	7·5	1,120	70	130
Coventry ...	135,000	994,207	7,639,065	7·7	1·23	57	68	2,516	5 9	·757	1·18	·866	6·4	424	35	41
Glasgow ...	1,150,000	23,335,008	311,480,086	13·348	·776	270·85	105·49	5,139	17·6	·477	2·31	·44	8·13	8,484·59	606·04	843
Huddersfield	160,000	(a) 2,383,858	21,595,569	9·09	1·18	144	120	3,675	13·4	·728	1·39	·70	7·48	868·32	54·27	86
Hull ...	287,032	4,040,739	42,997,226	10·64	·877	149·80	127·10	5,141	10/7	·631	2·75	...	9	1,393·6	87·10	160
Leeds ...	500,000	8,795,465	89,668,185	10·2	1·088	179	113·35	3,594	16/3	(b) ·937	1·95	·539	7·48	3,190	213	232
Leicester ...	229,296	3,663,215	32,907,795	8·983	·981	143	95	3,648	11/9	·693	2·18	·984	8	1,926	107	140
London ...	...	H 1,056,481	11,550,504	10·93	·78	...	77·12	2,365	...	1·09	...	...	5·85	500·84	38	74
		E 52,886,623	501,102,149	9·48	1·03	...	117·15	7,867	...	·69	...	...	8·82	16,427·36	1,237	1,661
Newcastle ...	300,000	4,780,662	52,204,974	10·92	1·082	174	...	3,738	15/2	·593	1·58	·633	7	...	...	192
Northampt'n	90,793	640,158	6,727,190	10·51	·97	76·53	...	2,974	6/-	·58	1·34	·7	6·91	...	...	26
Portsmouth	241,256	2,155,508	24,520,647	11·37	1·052	101·63	84	3,505	9/-	·511	1·66	·62	7	1,072	72	100
Preston ...	120,000	970,719	9,567,366	9·85	1·06	79·73	132	2,498	7/2	·603	1·01	·95	7·36	...	...	33
Reading ...	76,000	915,180	8,251,274	9·01	·97	108	97	2,505	8 8	·57	1·59	·68	7	352	26	36
Sheffield ...	466,408	8,071,188	96,330,242	11·935	·893	206·535	103·32	4,606	15 5	·517	2·62	·386	7·372	3,103·27	214·019	279
Wellington	68,000	2,303,913	25,858,412	11·08	1·40	350	90	4,706	43/11	·94	1·112	·88	7·86	803	70	89

E—Electric trolley system. H—Horse lines. (a) Including 9,417 miles coal haulage. (b) Total expenses per passenger.

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TRAMWAY AND OMNIBUS SHARE LIST.

Specially Compiled for "The Tramway and Railway World."

Amount Ranking for Dividend.	Shares.	Name.	Div'd. Prev. Half-year.	Div'd. Last Half-year.	Quotations, Feb. 6.	Movement Since Jan. 6. Rise.	Fall.	Latest Business Done. Price.	Date.	Yield on Buying Price. £ s. d.	Dividend Due. (Final in Italics.)	Quotations, Jan., 1908, to Feb. 6, 1914. Highest	Lowest
640,000	5	Anglo-Argentine Tramways 5½% Cum. 1st Pref.	2/9	2/9	4⅞–5⅛	+ 1/32	...	5 1/16	Feb. 5	5 7 6	Jan., Dec.	5 3/32	4¼
500,000	5	Do. do. 5½% Cum. 2nd Pref.	2/9	2/9	4⅜–4⅝	+ 1/16	...	90 7/8	Jan 26	5 14 3	June, *Dec.*	5 3/32	4 7/16
1,500,000£	...	Do. do. 5% Deb. Stock Red.	5%	5%	96½–98½	...	— 1	97⅝	Feb. 5	5 1 6	June, Dec.	105½	95½
325,532£	Stk.	Auckland Elec. Trys. Co. 5% Mort. Deb. ...	5%	5%	103–106	+ 4	...	103¼	Dec. 22	4 15 3	Jan., July.	107	99½
75,000	1	Bath Electric Tramways 5% Cum. Pref. ...	6d.	6d.	⅝–¾	...	— 1/32	14/6	Dec. 31/12	6 13 6	*Jan. & July*	1/16	1/16
331,696£	Stk.	Birmingham Dist. Pow. & Tract. 4½% 1st Deb....	4½%	4½%	85½–87½	+ 1½	...	87½	Dec. 13	5 3 0	Jan., July.	96	77
15,000	10	Blackpool and Fleetwood Tramways	4/-	13/-	15 –16	+ ½	...	14½	Jan. 5	5 6 3	Feb., Aug.	16	12
60,000	10	Bombay Elec. Supply & Trys. Co. 6% Cum. Pref.	6/-	6/-	13½–14½	+ 3	...	11⅜	Jan. 12	3 9 0	Feb., Aug.	14½	7⅞
1,003,614	$100	Brazil Traction...	6	6	91–93	+ 8	...	91⅞	Feb. 5	6 12 3	Fb.My Ag.Nv.	105½	83½
75,000	5	Brisbane Elec. Tramways Investment Co. Ord.	4/-	4/-	7⅜–8⅛	+ ⅜	...	7 1/16	Feb. 5	4 18 6	*May*, Oct.	9⅛	3 5/16
75,000	5	Do. do. do. 5% Cum. Pref.	2/6	2/6	4⅞–5⅜	...	...	4 1/16	Feb. 4	4 13 0	*May*, Nov.	5⅜	4⅜
50,000	10	Bristol Tramways and Carriage Co.	4	4	5⅞–6	...	...	5½	Oct 29	6 13 6	*Feb.*, Aug.	14½	5
50,000	10	Do. do. do. 4% Cum. Pref.	4	4	6½–7	...	...	6½	Nov. 21	5 14 6	Jan., July.	9¼	6¾
800,000£	Stk.	British Columbia Electric Railway Def. Ord. ..	8%	8%	119–123	+15	...	122½	Feb. 4	6 10 3	May, Nov.	156	114
800,000£	Stk	Do. do. Pref. Ord.	6%	6%	107–111	+ 5	...	109¾	Feb. 5	5 9 3	Feb., Aug.	132⅛	103
800,000£	Stk.	Do. do. 5% Cum. Perp. Pref.	5%	5%	102½–105½	+ ½	...	105	Feb. 2	4 14 9	Jan., July.	114	98½
1,070,097£	Stk.	British Electric Traction Prefd. Ord.	...	...	16–18	+ 4½	...	17½	Feb. 5	...	Apr., *Oct.*	17⅛	8
403,503£	Stk.	Do. do. 6% Cum. Pref. ..	6%	6%	92–95	+ 5	...	59 3/8	Feb. 5	6 6 6	Feb., *Aug.*	95½	73
1,464,245£	Stk.	Do. do. 5% Perp. Deb. ...	5%	5%	93–96	+ 1	...	94½	Feb. 5	5 6 6	April, Oct.	101	82½
439,796£	Stk.	Do. do. 4½% 2nd Deb. Red. ...	4½%	4½%	79–82	+ 2	...	79	Jan. 30	5 11 3	May, Nov.	84	58
246,625£	Stk	Buenos Aires Port & City Trys. 6% 1st Mt. Deb.	6%	6%	73–78	...	— 11	70	Feb. 5	7 14 0	Feb., Aug.	103	61
623,270£	Stk.	Buenos Ayres Lacroze Trys. Stg. 5% 1st Mt. Deb.	5%	5%	100½–102½	+ 1½	...	101¼	Jan. 15	4 19 6	Mar., Sept.	103	89
137,610	5	Calcutta Tramways Ord.	5/-	2/6	6–6½	+ ⅛	...	6 1/32	Feb. 4	5 15 6	*Apr.*, Oct.	7¼	4
47,295	5	Do. 5% Cum. Pref.	2/6	2/6	5–5½	+ ⅛	...	5 1/32	Feb. 5	4 15 3	Jan., July	5⅜	4⅜
491,222	1	Cape Electric Tramways	1/-	for '12	31/32–32/32	...	...	14/–	Feb 5	6 19 3	Feb., *Nov.*	1/32	1/16
15,000	10	Carthagena and Herrerias Steam Tramways ...	4/-	May, '13	3–3¾	...	...	75/–	May 6	5 6 9	April.	7	3
248,000	5	City of Buenos Ayres Tramways (1904) ...	2/6	2/6	5 1/16–5 1/16	+ 1/16	...	5 1/16	Feb. 5	4 8 3	Fe My.Au No	6	5⅛
120,000£	Stk.	Colombo Elec. Trys. & Ltg. 5% 1st Mt. Deb. ...	5%	5%	89–93	+ 1	...	90	Jan. 7	5 8 9	May, Nov.	101	87
11,500	10	Cork Electric Tramways and Lighting Co. ...	...	6/- ann.	4¼–4¾	...	...	4 13/20	Dec. 23	6 6 6	*Mar.*	10	4¼
12,327	10	Do. do. do. 5% Cum Pref.	5/-	5/-	6¾–7	...	— ¼	6⅝	Jan. 29	7 13 0	Jan., July	10⅜	6⅝
3,000	10	Dublin and Lucan Elec. Railway 5% Cum. Pref.	5/-	5/-	8¼–8¾	...	...	9	Aug. 25/10	5 14 3	Sep.15 Mar.15	9¼	6
60,000	10	Dublin United Tramways Co. (1896), Ltd., Ord.	6/-	6/-	10¾–11¼	...	...	11⅛	Feb. 3	5 6 9	Feb., Aug.	14	10⅛
60,000	10	Do. do. do. 6% Cum. Pref.	6/-	6/-	12¼–12¾	+ ½	...	12½	Feb. 3	4 14 3	*Feb.*, Aug.	14	11⅛
13,500	10	Gateshead & District Trys. Co. Ord. ...	9/-	5/-	8¾–9¼	...	...	9	Jan. 7	7 11 9	*Mar.*, Sept.	9⅛	7⅛
268,235	10/-	Hastings and District Elec. Trys Ord.	...	...	29/32–30/32	...	...	1/9	Jan. 5/12	...	...	1 3/16	29/32
80,000	1	Do. do. 6% Cum. Pref. ...	6%	6%	1 1/16–1 1/8	...	...	12/6	June 6	8 14 6	...	1 1/4	1 1/32
125,000£	Stk.	Do. do. 4½% Deb. Stk. Red.	4½	4½	66–71	...	...	68	Jan 14	6 6 9	April, Oct.	100	67½
$9,634,000	$1.000	Havana Elec. Rly. Co. Con. Mort. 5%	5%	5%	95½–97½	...	— 1	96½	Dec. 23	5 7 6	Feb., Aug.	105	80
195,000£	100	Hong Kong Tramways Co. 5% Mt. Deb. ...	5%	5%	86–90	+ ½	...	86	Jan. 23	5 12 6	May, Nov.	92	75½
20,000	10	Imperial Tramways Ord.	Nil	4% year	3½–3¾	...	— ¼	9¾	Oct. 29.09	10 13 6	Feb., Aug.	9¾	2¼
20,000	10	Do. 6% Cum. Pref.	...	6% year	6¼–6½	...	...	6 3/32	Ju. 28/09	9 4 9	Jan., July.	9¾	2¾
30,000	5	Isle of Thanet Elec. Try. & Ltg. Co. 5% Cum. Pref.	2/6	Dec. '12	2–2½	+ ¼	...	46/3	Nov. 30/12	6 0 0	*Mar.*, Sept.	3	¾
250,000	1	Kalgoorlie Electric Tramways	...	...	0–1/16	...	...	1/–	Jan. 15/12	...	*May*	1/16	0
170,000	1	La Plata Elec. Trys. Co. 6% Cum. Pref. ...	0/4·65	0/4·80	⅛–1	...	...	17/–	Oct. 14	...	*April*, Oct.	1 1/16	¼
30,800	10	Lanarkshire Tramways	6/–	6/–	10–10½	+ ¼	...	10½	Nov. 24	5 19 3	Feb., Aug.	10⅝	9⅜
250,000£	Stk.	Lancashire United Trys. 5% Prior Lien Deb....	5%	5%	81–83	+ 4	...	78¾	Oct. 11	6 6 9	Jan., July.	95	76
634,026	1	Lisbon Electric Tramways Ord.	7⅛d.	7⅛d.	1 1/16–1 1/16	...	— 1/16	22/3	Aug. 25	4 11 6	*July.*	1 3/32	⅜
425,553	1	Do. do. 6% Cum. Pref ...	7⅛d.	7⅛d.	1–1⅛	...	— 1/16	22/6	Feb. 15	5 6 9	Jan., July.	1⅛	1/8
1,666,673	1	London and Suburban Traction Ord.	...	...	1/16–⅛	...	...	4/6	Feb. 3	...	...	1/32	1/32
1,316,268	1	Do. do. do. 5% Cum. Pref.	...	5	⅝–¾	+ 1/32	...	14/6	Feb. 5	6 13 6	Feb., Aug.	¾	1/16
1,000,000£	Stk.	London General Omnibus 4½% 1st Deb.	4½	4½	97–99	+ 3	...	98	Feb. 5	4 11 0	Jan., July.	98¼	92¼
1,000,000£	Stk.	Do. do. 5% Cum. Income ...	5	5	92–95	+ 7	...	93¾	Feb. 4	5 5 3	Feb., Aug.	95	85½
1,649,930£	Stk.	London United Tramways 4% 1st Deb. Stk. ...	4	4	65–68	+ 3	...	65½	Feb. 2	5 17 9	*Jan., July.*	82	54¾
63,430£	Stk.	Madras Elec. Trys. (1904) Ltd. 5% Deb. Red. ...	5%	5%	101–103	+ 2	...	101½	Oct. 16	4 17 3	Jan., July.	105	86
20,000	5	Do. do. do. 6% Cum. Pref. ...	...	...	4⅛–5¼	...	...	5⅛	Jan. 7	5 14 3	...	5¼	87/6
300,000£	100	Manaos Trys. & Ltg. Co. 5% 1st Debs.	5%	5%	79–82	...	...	79½	Jan. 13	6 2 0	Jan., July.	97	79
$4.785,000	$1.000	Manila Elec. R. R. and Ltg. Corp. 5% Gld. Bds.	5%	5%	98½–100⅛	+ 2	...	101	Feb. 5	5 2 0	Mar., Sept.	104⅜	84
60,000	1	Mansfield & District Trys. Ltd. 6% Cum. Pref.	7⅛d.	7⅛d.	⅛–1	...	...	18/6	Sept. 24	6 0 0	Mar., Sept.	1 1/16	¾
$20,000,000	$100	Mexico Tramways Common Stock	$3½	$3½	76–79	+13	...	77	Feb. 5	...	Fb.My.Au No	151½	61
$3,840,000	...	Michigan Untd Rys. Co. 5% 1st Debs & Refdg Bds	5%	5%	91½–93½	+ ½	...	91¼	Feb. 5	5 7 0	May, Nov.	101½	89½
600,000£	100	Montreal Street Rly. 4½% Ster. Debs.	4½%	4½%	98–100	...	...	100	Feb. 3	4 10 0	Fe.My.Au.No.	107	97
150,000	1	National Steam Car	6%	year	⅝–¾	..	— 1/16	16 3	Feb. 5	6 17 3	Dec.	39/9	15/–
5,000	10	Oldham, Ashton, and Hyde Elec. Tramways Ord.	7/–	5/-	5¾–6	...	...	7	Apr. 2	10 0 0	Mar., Aug.	9⅜	6¼
5,000	10	Do. do. do. 5% Cum. Pref.	5%	5%	6–6¼	...	— ⅛	6 1/32	July 8/12	8 0 0	Feb., Aug.	8½	6½
77,893	5	Para Elec. Rly. and Ltg. Co., Ord.	5/-	5/-	5–5⅛	...	...	5⅛	Feb. 5	9 2 0	May, Nov.	8	5
100,000	1	Perth (W.A.) Electric Tramways Ord.	6d.	7⅛d.	1 1/16–1 1/16	...	...	25/6	Nov. 8/12	...	*Sept.*, Nov.	26/10½	⅜
245,000	1	Potteries Electric Traction Ord.	3½	for '12	⅜–½	+ 1/16	...	7/9	Feb. 2	7 0 0	April.	¾	⅜
245,000	1	Do. do. 5% Cum. Pref. ...	6d.	6d.	1/16–1/8	...	...	12/–	Feb. 2	7 5 6	*Feb.*, Aug.	¼	1/16
124,560	1	Provincial Tramways Ord.	10d.	8d.	31/32–32/32	...	...	18 –	Nov. 11	9 17 6	May, *Nov.*	1 1/16	13/–
10,000	10	Do. do. 6% Cum. Pref.	6/-	6/-	9–9¼xd	...	...	9¼	Oct. 30	6 9 9	June, *Dec.*	11	9
50,000	5	Rangoon Elec. Trys. & Supply Co. 6% Cum. Pref.	3/-	3/-	5–5⅛	...	...	5 1/16	July 17	5 9 3	June, Dec.	6	5
32,000	10	Shanghai Elec. Construction Co.	10/-	year	11¼–12¼	+ 1¼	...	10⅝	Dec. 29	4 1 9	May.	12¼	6
330,400£	Stk.	Singapore Elec. Trys. Ltd., 5% Debs. Red. ...	5%	5%	87–91	...	...	90	Feb. 3	5 12 6	Mar., Sept.	91	61
169,570	1	S. Metrop'n Elec. Trys. & Ltg. Co. 6% Cum. Pref.	1/2½	May, '13	⅝–¾	...	...	15/9	May 16, '12	8 0 0	Feb., Aug.	1⅛	⅝
91,720£	Stk.	Southern Elec. Trys. of B.A., 1st Mt. Deb. ...	5%	5%	98–100	+ 5	...	100⅝	Jan. 20	5 2 0	Feb., Aug.	100⅝	90
471,500£	100	Toronto Rly. Co. 1st Mt. 4½% Stg. Bonds ...	4½%	4½%	98–100	...	...	98½	Nov. 26	4 12 0	Feb., Aug.	104	97
80,000	5	United Elec. Tramways of Monte Video, Ord....	3/-	4/-	4½–5	+ ⅛	...	4 1/16	Feb. 4	7 0 0	*June*, Dec.	6¼	4⅝
90,000	5	Do. do. do. 6% Cum. Pref.	3/-	3/-	4⅝–5¼	+ ⅛	...	5⅛	Jan. 2	5 14 3	June, Dec.	6⅛	4 7/16
500,000£	Stk.	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Debs.	4½%	4½%	95–97	...	...	96	Feb. 4	4 13 9	Apr., Oct.	109½	94½
40,977	5	Yorkshire (West Riding) Elec. Trys. Ord. ...	...	...	⅜–½	...	...	7/6	Feb. 4	...	*Mar.*	1½	⅜
46,261	5	Do. do. do. 6% Cum. Pref.	1/6	2/6	3¼–4½	+ ¼	...	78/1⅛	Feb. 4	5 14 3	*Mar.*	4	1½

ELECTRIC RAILWAY SHARES.

1,854,720£	Stk.	Central London Ord. Stock (4% Guar.)	...	...	84–86	+ 2	...	86	Feb. 3	4 15 3	*Feb.*, Aug.	89½	59⅛
572,640£	Stk.	Do 4% Guar. Pref. Stock	4	4	84–86	+ 2	...	86	Jan. 24	4 15 3	Feb., Aug.	92	80
572,640£	Stk.	Do. Deferred Stock (4% Guar.) ...	...	...	83–85	+ 5	...	83⅛	Feb. 5	4 16 3	Feb., Aug.	91⅛	42
50,000	10	Liverpool Overhead Ord.	2/6	3/6	4 1/16–4 1/16	...	...	96 5	Feb. 2	5 4 0	*Feb.*, Aug.	4⅛	⅜
1,412,263£	Stk.	Mersey Cons. Ord. Stock	Nil	Nil	5⅛–6¼	...	...	6	Feb. 3	...	*Feb.*, Aug.	8	1
5,732,062£	Stk.	Metropolitan Cons.	1½	1½	45¼–46½	...	— ¼	45½	Feb. 5	3 10 3	*Feb.*, Aug.	75⅛	34
2,640,914£	Stk.	Do. Surplus Lands Stock	2½	2½	64–66	+ 6	...	65½	Feb. 5	4 3 6	*Feb.*, Aug.	72	58
3,235,000£	Stk.	Metropolitan District Ord.	Nil	Nil	32¼–32¾	+ ¼	...	32½	Feb. 5	...	*Feb.*, Aug.	51½	9½
500,000	10	Underground Electric Railways Co. of London	...	...	3¼–3⅝	+ ¼	...	75 7½	Feb. 2	...	...	5 1/16	1⅛
1,730,000£	...	Do. 4½% Bonds of 1933	4½%	4½%	100–102	+ 3	...	101	Feb. 5	4 8 0	Jan., July	102	73
1,192,707£	...	Do. 6% 1st Income Debs.	6%	6%	116–118	+ 4	...	118	Feb. 3	5 3 6	Mar., Sept.	118	108
6,120,750£	Stk.	Do. 6% Income Bonds	60/-	60/-	95–96	+ 5	...	95½	Feb. 5	6 7 9	Mar., Sept.	97½	18
1,150,477	1/-	Do. "A" Ord.	...	...	1/32–1/16	+ 1/16	...	9 4½	Feb. 5	...	...	⅜	⅛

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PERSONAL.

Mr. J. E. Ellis, borough electrical engineer to Morley Council, has been granted an increase in salary from £225 to £250 per annum.

Mr. F. L. Pedley, of the Bradford Council electricity works, has received the appointment of electrical engineer to Bingley Council.

Mr. H. E. Yerbury, chief tramways electrical engineer, of Sheffield, has been voted an increase of salary to £550, rising to a maximum of £600.

Mr. F. Newey, of Rawtenstall, has been appointed electrical engineer on the staff of the Swindon electricity and tramway departments.

Mr. J. W. Turner has been appointed deputy electrical engineer to Huddersfield Corporation. The salary is £230 per annum, rising to £260.

Mr. D. L. Winter, of Bo'ness, has been appointed resident engineer of the Musselburgh and District Electric Light and Traction Company.

Mr. R. L. Acland, borough electrical engineer and tramways manager of Chesterfield, has been granted an increase of salary to £500 per annum.

Mr. J. C. Richards, of the Erith Council tramway, out of 51 applicants, has been appointed chief inspector to the Ilford Council tramway undertaking.

Mr. Robert Watson, recently secretary of the Musselburgh and District Electric Light and Traction Company, Limited, in London, has been appointed manager, in succession to Mr. C. W. Bentley, who has resigned.

Mr. T. G. Marsh, of the Chatham and District Light Railway Company, on being appointed chief inspector to the Maidstone and District Motor Services, has been presented with an umbrella and pocket wallet by the Chatham staff.

Mr. William F. Hamilton, K.C., and Mr. G. A. Touche, M.P., have been elected directors of the Anglo-Argentine Tramways Company, to fill vacancies caused by the deaths of Mr. T. Frame Thomson and Mr. E. A. Lazarus-Barlow.

Mr. Day, of the electrical department, Surrey Commercial Docks, Port of London Authority, has been presented with an electrical engineering dictionary, on the occasion of his resigning to take up the position of electrician at the University of Hong-Kong.

Mr. H. McKay, on resigning the appointment of draughtsman to Aberdeen Corporation Tramways, in order to join the staff of Preston Corporation Tramways, has been presented with a set of water colours. Mr. Forbes, traffic superintendent, handed the gift to the recipient.

Mr. G. S. Duncan, consulting engineer of the Melbourne Tramways Company, who has spent some months in this country, has returned to Melbourne. During his visit Mr. Duncan devoted attention to the study of street traffic methods in London, with particular reference to motor omnibuses.

Mr. Bernard M. Jenkin, owing to continued ill-health, has retired from his partnership in the firm of Messrs. Kennedy and Jenkin. The partnership will be continued by the remaining partners, Sir Alex. B. W. Kennedy, Mr. J. M. Kennedy and Mr. S. B. Donkin, under the name of Kennedy and Donkin.

Mr. G. W. Knight, who has been temporarily engaged as superintendent of London County Council central car repair depot since June last, has been placed on the permanent staff in the same post at a salary of £300 a year. The Highways Committee reported that Mr. Knight had carried out his duties in a very satisfactory manner.

Mr. A. Fraser, electrical and mechanical engineer, Aberdeen, has been appointed sales engineer for Scotland for Messrs. Siemens Brothers Dynamo Works. Mr. Fraser, who has held for the past three years the position of engineer-in-charge at the power-station of the Glasgow Corporation electricity department, will have his headquarters at Glasgow.

Mr. H. Holliday, engineer and manager to the Torquay Tramways Company, has been presented with a smoker's outfit in crocodile case, which bore the following inscription: "Presented to H. Holliday, Esq., by the general staff of the Torquay Tramways, in appreciation of kindness, to commemorate the record year of 1913." A vote of thanks was passed to the directors for increasing the wages of the staff and for the bonus paid at Christmas.

Councillor F. Spashett, chairman of Lowestoft Tramways Committee, following his annual custom, has entertained the employees at dinner. Among those supporting him were the Mayor (Councillor J. W. Brooke), the heads of the tramway and other departments. The health of Councillor Spashett was proposed by the general manager (Mr. H. H. Saunders), who, on behalf of the employees, asked his acceptance of a silver tray, as a token of their appreciation of his interest in their welfare.

Mr. E. W. Sleight, engineer and manager of the Carlisle Electric Tramways Company, presiding at the ninth annual dinner of the employees, mentioned that this was the first occasion on which they had met together in a social capacity as the guests of the citizens of Carlisle since Messrs. Balfour and Beattie took over the system. He referred to the good feeling existing between the company, their employees, and the public, and emphasised how much the men could foster that feeling by civility and courtesy.

Mr. C. Clarke has been advanced from the position of acting manager of Birkenhead Tramways to that of general manager. Councillor Halsall said the committee were quite satisfied with Mr. Clarke's services. Mr. Clarke, he added, had been commended in regard to different matters, and in particular with regard to the way in which he looked after the traffic during the King's visit to Liverpool. His report on motor omnibuses and the extension question also gave satisfaction to the Parliamentary Committee.

New Appointments for Glasgow Officials.—Mr. George Pollock, who has for some time being employed in Dennistoun depot of the Glasgow tramways, left recently for Shanghai, where he will receive an inspectorship under Mr. Donald MacColl, a former official in Glasgow. Mr. S. Jameson, of the mains staff, has received an appointment as assistant mains superintendent on the London County Council tramways. Mr. George Barclay, who is on the head office staff, has been appointed traffic superintendent of the Delhi tramways.

Mr. W. Murphy, chairman of Dublin United Tramways Company, presided at the annual meeting of Dublin Chamber of Commerce on January 27. He remarked that resistance to and the defeat of Syndicalism in Dublin had been followed by similar results in Leeds, in Auckland (New Zealand), and in South Africa, where they had drastic methods of dealing with men of the Larkin type. The victory they had won should not absolve employers from the obligation of seeing that their workpeople received a wage which would enable them to live at least in frugal comfort.

Messrs. W. T. Dawson and J. O. Shepherd, respectively general manager and secretary to the Wemyss and District Tramways Company, were the subjects of congratulatory remarks at the annual dinner and dance of the employees. Mr. Russell, in proposing the toast of the Tramways Company, stated that in 1906-7, the first year of running, 1¼ million passengers were carried, while in 1913 they reached the record total of over two millions. In acknowledging the toast, Mr. Shepherd observed that they had an excellent manager, who was respected by every employee. Mr. Dawson announced the receipt of gifts from the directors for the employees, their wives, and children.

Salford Appointments.—The following appointments have been made in the tramways department: Mr. W. Blakemore to be traffic superintendent, at £200 per annum, rising by two annual increments of £20 and one of £10 to a maximum of £250; Mr. C. F. Ellewood to be chief clerk of the traffic staff at £140 per annum, rising to a maximum of £200; Mr. H. Richardson, permanent way superintendent, has had his salary increased from £200 to £220, rising to £250 per annum maximum. Increases have also been granted to Mr. W. Billington, chief clerk of the general staff, Mr. R. Chadwick, car depot superintendent, and Mr. H. Weston, overhead equipment superintendent.

Mr. G. F. Craven, general manager and engineer, Reading Corporation Tramways, at the January meeting of the Council was recommended by the Tramways Committee, after considering the report on the working of the undertaking from December 1, 1912, to November 30, 1913, for an increase of his salary from £400 to £600 by four annual increments of £50, the first to take effect from January 1, 1914. An amendment that the salary be raised to £450 without immediate provision for further increments was defeated, and the recommendation was agreed to unanimously. The Mayor (Alderman Field), chairman of the committee, said the committee came to the conclusion that £600 was the salary to pay. Last year Mr. Craven was appointed on probation, and he had given the very greatest satisfaction. A progressive salary secured the man receiving it for many years in all probability; it also had the advantage of not coming up for consideration so frequently.

Promotions in L.C.C. Chief Engineer's Department.—At a meeting of the London County Council on February 3, the Establishment Committee adopted a report recommending that Mr. W. C. Copperthwaite, assistant engineer in charge of the bridges branch, be promoted to the position of chief assistant engineer, and that his salary of £900 be increased to £1,000 a year. It was also agreed that a personal allowance of £50 a year be granted to Mr. H. M. Rounthwaite, the mechanical engineer. The maximum salary attaching to the position is £800 a year, and having regard to the high terms in which the chief engineer spoke of Mr. Rounthwaite's capacity, the committee proposed the grant of a personal allowance of the amount mentioned. The following other recommendations were also approved: That Mr. P. R. Jones (£300), assistant in the first-class, be promoted to be a senior assistant at a salary of £350 a year; that Mr. W. H. Pickin be placed in the first-class in the chief engineer's department at his present salary of £300; that Mr. J. B. Cook be appointed in section B in the first-class in the chief engineer's department at the commencing salary of £215 a year.

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CONTRACTS AND ORDERS.

Stockport Council have placed a contract with the Leeds Steel Company, Limited, for tramway rails.

J. Smith and Company, of Derby, have received a contract to supply uniforms for Derby tramway employees.

Preston Corporation have ordered the electrical equipment for six new cars from Dick, Kerr and Company, Limited.

The United Electric Car Company's tender for six car bodies and trucks has been accepted by Preston Town Council.

Messrs. Dick, Kerr and Company have an order for electrical equipments for seven new cars for Northampton Corporation.

Southport Council have given to the British Westinghouse Company a contract for the supply of an alternator, at £1,920.

Daimler Company, Limited, have received a contract to supply a 40-H.P. petrol motor lorry to Bradford tramways department.

Dover Town Council have placed an order with Dick, Kerr and Company, Limited, for 50 tons of rails and the requisite supply of fish plates.

Siemens Brothers Dynamo Works have an order from Norwich Town Council for a high-tension switchboard, for the new alternator and rotaries.

Babcock and Wilcox, Limited, are supplying a water-tube boiler to Leigh Council, and coal-conveying plant to the Rawtenstall Corporation.

Mr. W. J. Turnbull has obtained a contract for the erection within six months of a tramcar depot at Guiseley for Leeds Corporation, at £14,050.

Dundee Council have placed contracts with Dick, Kerr and Company, Limited, and Willans and Robinson, Limited, for the supply of 5,000-KW. turbo-alternators with condensing plant.

Burnley Council have placed a contract with the British Westinghouse Company, Limited, for plant for the new station, £2,864; and with the British Insulated and Helsby Cables, Limited, for cable.

The Electro-Mechanical Brake Company, Limited, West Bromwich, have received an order from the Bradford Corporation for 30 sets of their "EMB" jointless grid resistances for railless trolley omnibuses.

Ashton-under-Lyme Council have allotted a contract to the United Electric Car Company, Limited, for the supply of two car bodies and trucks, and to Siemens Brothers Dynamo Works for the equipments.

Rotherham Council have placed a contract for extensions to the tramcar shed, at £6,755, with Chadwick and Company, and with Hadfield's Steel Foundry, Limited, for special trackwork at the Fitzwilliam Road track.

The Italian State Railways have placed orders for the supply of 41 electric locomotives with the Italian Westinghouse Company, for 18 with the Tecnomasio Italiano, and for 18 with the Costruzioni Meccaosche di Saronno.

The British Westinghouse Electric and Manufacturing Company have an order from Huddersfield Electricity Committee for condensing plant, and from the Port of London Authority for three 1,000-KW. rotary converters.

Hull Tramways Committee have adopted a recommendation of the manager that 100 breast punches be hired for twelve months as an experiment, as the old hand punches were becoming defective. The new punch is worn on the breast of the conductor.

Leicester Council have accepted the following tenders: Dick, Kerr and Company, electrical equipment and trucks, £3,846; Brush Electrical Engineering Company, 10 canopy top tramcar bodies, £3,842; Messrs. Siemens Brothers Dynamo Works, turbo-alternator, £11,352.

Glasgow Council have placed contracts as appended: Steel conduits and fittings, Siemens Brothers Dynamo Works, Limited; washed dusters, James B. Horne; electrically-controlled clocks for Coplawhill Car Works, Edward and Sons; special trackwork, Lorain Steel Company.

Bedford Council have allotted contracts as subjoined: Turbine, alternator, etc., British Westinghouse Company, £5,938; boiler, fittings, and settings, Stirling Boiler Company, £1,146; superheater, The Superheater Units, Swansea, £115; mechanical stoker and coal-handling plant, T. and T. Vicars, £868.

South Shields Council have accepted the following tenders: 2,000-KW. three-phase turbo-generator, and two 600-KW. rotary converters, British Westinghouse Electric and Manufacturing Company, Limited; two water-tube boilers, with superheaters, stokers, etc., and economiser, Babcock and Wilcox, Limited.

Doncaster Council have accepted the following tenders: Feeder panels, Crompton and Company, Limited, £169; high-tension main switchboard and regulator, Siemens Brothers Dynamo Works, Limited, £1,019; panels for rotary converters, British Westinghouse Company, Limited, £193; exhaust piping, Willans and Robinson, Limited, £177.

Six More P-A-Y-E Cars for Aberdeen.—On January 5 the City Council adopted the recommendation of the Tramways Committee for the acceptance of the tender of the Brush Engineering Company for the construction of six pay-as-you-enter cars at £2,490. This tender was the lowest, and in the course of discussion it was stated that the amount was £1,000 below the local firm's offer.

Bradford Council have placed a contract with the Adnil Electric Company, Limited, to supply, deliver, and erect at the Valley Road Electricity Works a 5,000-KW turbo-generator, running at 1,500 revolutions per minute, manufactured by the Bergmann Electrical Works, Berlin, at £9,370. It is estimated that on the usual basis quite three-quarters of the amount of the contract will be paid for foreign labour.

Sheffield Council have allotted a contract to R. White and Sons for extending the coal handling aerial ropeway at Neepsend power house, £355 6s.; and to W. Marlow and Sons for foundations for three boilers, two fan houses at Neepsend, £2,403. The contract with A. Reyrolle and Company for 14 panels of sub-station switch gear is to be extended to provide for a further 14 panels at the same price, viz., £1,682.

Clough, Smith, and Company, Limited, Spencer House, South Place, London, E.C., have secured from the Cedes Electric Traction, Limited, the contract for the erection of the overhead equipment of the Keighley Corporation trackless extensions, a length of 7 miles, at an average contract rate of £923 per route-mile. This firm also carried out the first section of the Keighley trackless system, a route length of 1 mile 1,400 yards.

North Eastern Steel Company, Limited, were the successful tenderers for the supply of tramway rails to Southampton Council, at the following prices: 100 tons of B.S.S. No. 4, £6 12s. 6d. per ton; 20 tons of B S.S. No. 4 C, £6 12s. 6d. per ton; additional price per ton for Sandberg quality, 5s. Walter Scott, Limited, Bolckow, Vaughan, and Company, Limited, and Lorain Steel Company, Limited, also submitted tenders.

Petrol and Tire Contracts.—Alderman Spencer, chairman of Halifax Tramways Committee, at the January meeting of the Council, alluded to the receipt of tenders for petrol and omnibus tires, and suggested that the decision be delayed, as the committee hoped to arrive at better terms than previously arranged. The omnibuses were not running at a profit, but the committee hoped to reduce the loss by securing better terms for petrol and tires.

The Peckham Truck Company, of Queen Anne's Chambers, Westminster, S.W., have during the past year received orders for long wheel base pendulum radial trucks, which have recently been described in these pages, from over 20 tramways in the United Kingdom. The reports received from a number of these lines where the trucks are in use indicate that they are proving satisfactory, and in several cases second and third orders have already been received.

Manchester Tramways Committee have allotted the following contracts: Ransomes and Rapier, Limited, wagon turn-table for Hyde Road permanent way department; Stedman, Crowther, and Company, block tin; Tangyes, Limited, car wheel tire turning lathe; Till and Whitehead, Limited, metal fittings; Equipment and Engineering Company, Limited, route number plates; Chloride Electrical Storage Company, Limited, supply and maintenance of a traction storage battery at Dickinson Street station; Lancashire Dynamo and Motor Company, Limited, reversible booster, regulator, and switch gear for the traction storage battery (switch gear sub-let to Mr. Bertram Thomas); British Westinghouse Company, Limited, two 300-KW. rotary converters; Electrical Engineering and Equipment Company, Limited, cable; Siemens Brothers Dynamo Works, Limited, two 500-K.V.A. static transformers.

London County Council have accepted the following tenders: Edison and Swan United Electric Light Company, control gear and recording apparatus for use in testing car motors at the central car repair depot, £70 10s., less 2½ per cent. discount; Brightside Foundry and Engineering Company, steam, exhaust, condenser, and feed piping, water tanks, etc., for Greenwich generating station, £5,438 15s.; Hadfield's Steel Foundry Company, special trackwork for junction curves between Essex Road and Cannonbury Road, £2,200, and special trackwork for tramway lay-by in West India Dock Road, £300; Messens, Limited, Gracechurch Street, E.C., 120,000 wedges and 447,000 packing pieces, £663 2s.; W. F. Dennis and Company, Queen Victoria Street, E.C., 11,777 yards of 4.0 grooved trolley wire, £608 19s. 3d.; R. Hyde and Son, Sheffield, 12,100 driving and common links, £316 17s. 6d.; Babcock and Wilcox, 50 boiler tubes, £68 2s. 6d.; J. Billingham, Cradley Heath, 5 tons of treadplate, £82 17s. 6d.; G. A. Harvey and Company, Woolwich Road, S.E., repairs to 2,000 damaged fare bill plates, £95 16s. 8d.

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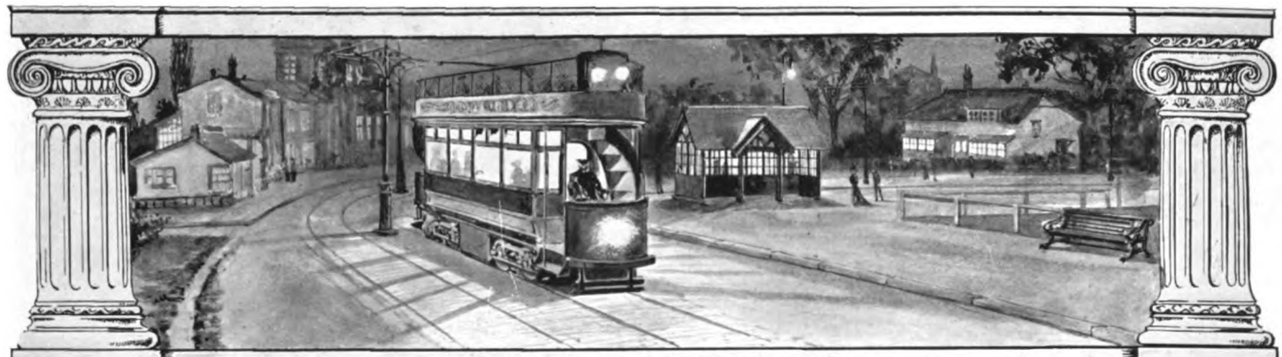

TRAMWAY AND LIGHT RAILWAY NOTES

BIRMINGHAM.

THROUGH RESERVED CARS—STAIRCASE MIRRORS—PETITION FOR ALL-NIGHT CARS.

Birmingham Tramways Committee have resolved to experiment with the running of through reserved cars from the centre of the city to Alcester Lanes End, in order to prevent the long-distance passengers from being crowded out by people who travel only a penny stage. The service is an 18-minute one. A town's meeting have authorised the Council to make application to Parliament for powers to provide and run motor omnibuses and to construct tramways. Looking glasses are now fixed above the top step of the Birmingham tramcars, thus enabling the conductor, when on the top deck, to see at a glance whether any inside passengers are intending to alight. The device saves much time and exertion. A memorial signed by 5,689 persons in favour of a service of cars during the night was presented to the Tramways Committee on January 20. Councillor Barrow, the chairman, said that if the committee could do anything to meet the desire of the night workers they would be pleased, but in no circumstances could they give a universal service of cars throughout the night.

BRADFORD.

TRACK RENEWALS—A CHANGE-READY WALLET—TRAMWAY AND RAILLESS EXTENSIONS.

The Tramways Committee have decided to renew the track in various parts of the city, at an estimated cost of about £29,000. A new bag for conductors has been adopted. It has a number of compartments which hold five pennies, while at each end are two spring holders similar to sovereign purses, to hold sixpences and shillings. Conductors take advantage of quiet intervals to refill the receptacles, and they are thus enabled to give change for any coin up to half-a-crown without delay. This facility is found to be of great advantage in connection with the collection on the platform of fares of top-deck passengers. The Corporation on January 13 passed a minute authorising the obtaining of 28 railless trolley cars and equipment. Councillor Priestley pointed out that the Council had decided that certain routes should be equipped, and he would like to get the work of one route through in view of the Yorkshire Agricultural Show being held in Bradford. On February 3 the tramway extension to Bingley was opened with due ceremony, and afterwards the members of the Tramways Committee and Bingley Council lunched at Bradford Town Hall.

BRISTOL.

THE CORPORATION AND THE TRAMWAYS COMPANY.

Bristol Corporation have agreed to the promotion of a Parliamentary bill to enable them, if and when they shall so decide, to work tramways and by agreement to purchase or take on lease any tramways or portions of tramways not purchasable by the Corporation in 1915. Approval was also given to the provision made in the bill to take a poll of the ratepayers upon the question of the acquisition of the tramways.

COLNE.

THE TRAMWAYS ARBITRATION.

The greater part of three weeks between January 5 and 19 inclusive was occupied by the arbitration proceedings between the Colne Light Railways Company and the Colne Corporation, before the arbitrator, Mr. A. J. Ram, K.C., at the Surveyors' Institute, Westminster. The question for decision was the purchase price of the company's undertaking in Colne and Trawden, with a branch line to Laneshaw Bridge, which the Corporation have agreed to take over. The company claimed £170,000. Mr Stephen Sellon and Mr. Harry England, general manager, Yorkshire (West Riding) Tramways Company, were the chief witnesses for the company, and Mr. J. E. Waller for the Corporation, who had offered about £27,000 for the undertaking. Mr. Waller's valuation was just over £24,000, and he estimated the cost of renewals at £34,145. Mr. Lloyd, K.C., on behalf of the company, said he was at a loss to understand how two engineers, eminent in their profession, could arrive at such widely differing figures as those given. Had anybody on the other side taken the trouble at an early stage to go into those differences, at least four or five days of that inquiry might have been saved. The arbitrator subsequently fixed the purchase price at £92,830.

DARWEN.

SUCCESS OF DINNER-HOUR FARES.

Mr. F. J. S. Hosken, general manager and engineer to the Corporation Tramways, has presented a report on the three months' working of cheaper fares, which the commitee have decided to adhere to permanently. An increase of 26·75 per cent. in the receipts between the hours of 12 noon and 2 p.m. has resulted from the dinner-hour tickets. Deducting the general increase of 8·7 per cent. over the whole system during the previous six months, the increase is 18·05 per cent. Extra cars have been required to deal with the increased traffic, but after allowing for this the extra cars return a profit of 5·15d. per car-mile. The all-round net increase in favour of the new cheap return tickets and dinner-hour tickets is 13 per cent.

DONCASTER.

FORTHCOMING EXTENSIONS—OMNIBUSES TO COLLIERY VILLAGES.

In proposing the toast of the Doncaster Corporation at the seventh annual dinner of the tramways and electricity employees on January 13, Mr. E. S. Rayner, general manager, remarked that the employees were fortunate in serving under such a Corporation. During the past year the Council had granted increased rates of pay, which showed they felt they were very well served. It was proposed to extend the tramways to Brodsworth and Edlington, and also to purchase omnibuses to run from outside termini to connect with various colliery villages.

HASTINGS.

PETROL-ELECTRIC CARS ON THE SEA FRONT.

On January 15 a Board of Trade inspector attended a trial run at Hastings of the first of 20 petrol-electric tramcars which the Hastings and District Tramways Company propose to order from W. A. Stevens, Limited. The cars are to be operated on the sea-front section in place of the Dolter surface-contact system, which the Board of Trade have refused to license any longer.

HUDDERSFIELD.

AN EXTENSION TO ELLAND.

The first tramcar on the extension of the Huddersfield Corporation's system from Birchencliffe to Elland Town Hall was driven by Mr. R. H. Wilkinson, the general manager. Colonel Druitt, of the Board of Trade, inspected the route three days later, and expressed his satisfaction with the way in which the work had been carried out. The length of the extension is nearly 1½ miles, and the total mileage of the Huddersfield tramways is now 31 miles. At the formal opening of the extension on January 14, Alderman Aston, chairman of the Tramways Committee, officiated, and Mr. S. Lumb, chairman of Lumb Council, drove the car on approaching the terminus. At a luncheon Alderman Aston expressed a hope that they would soon be able to link up with Halifax and have inter-running.

LEEDS.

TRAMWAY OFFICES AND SHELTERS—A RAILLESS EXTENSION.

The City Council have agreed to a proposal by the Tramways Committee to send a sub-committee to visit Bradford and Sheffield, for the purpose of inspecting tramway office accommodation, and for preparation of plans and estimates for the erection of offices at the corner of Swinegate and Bridge End. For a proposal that four members of the committee should visit a few towns to see the designs of tramway shelters the voting was equal, and the Lord Mayor passed to the next business. In

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recommending a railless trolley traction clause in the Corporation bill to the meeting of ratepayers, Alderman Smithson, chairman of the Tramways Committee, said they had always refused to take up any scheme unless satisfied that it was likely to prove profitable. The extension was a very small one, and the Guiseley route was one of the best paying ones in the system. The extension would serve a population of about 16,000 people. Councillor Gath (Labour), in supporting the resolution, said that he did not want to see Bradford cars getting on ground which Leeds should occupy. The population were gradually getting towards the outskirts.

LIVERPOOL.

New Belt Route—Track Laid in Grass—The Question of the Blind.

The Tramways Committee are inaugurating a new belt route from the Old Haymarket and back, with the object of relieving the congestion on the Wavertree and Southdown Road routes. Mr. J. A. Brodie, the city engineer, has placed before the Tramways Committee a scheme which will extend the city's reputation for wide roads, and also result in the formation of a unique road and tramway track. It is proposed to extend the Edge Lane tramway route to Robey Park, the powers for which expire in August next, and to widen Edge Lane as far as Rathbone Road to a width of 80 ft. From Mill Lane it is suggested that a roadway should be constructed 120 ft. wide to accommodate a roadway and a tramway track, the latter being laid in grass in the centre. At the Council's January meeting the Tramways Committee recommended "That not exceeding 250 blind workers be carried free on the tramways, subject to the condition that the Corporation shall not be under any liability in respect of injuries or accidents to persons carried free and to general conditions to be approved by the general manager." It was mentioned that over 30 Corporations now carried blind persons free, and one speaker said the sightless were often injured by colliding with tramway standards. On the motion of Alderman Dart, who said it would be better to vote a sum of money to the blind rather than to issue free passes, the recommendation was referred back.

LONDON.

Ticket Cancellation—Lay-by for Dock Traffic—London United and Trail Cars.

An agreement has been concluded between the London County Council and Mr. G. Gibson, a foreman in the ticket punch branch of the tramways department, providing that the Council may, should it so desire, use without any payment for royalty the ticket cancelling machine invented and recently improved by him. In order to avoid the reversing of cars at West India Dock Road during busy hours the Council have decided to construct a lay-by in that thoroughfare at its junction with East India Dock Road. In reply to an allegation made by a member of the Brentford Council that the London United Tramways Company's Bill would take away a lot of the powers that that Council held, the clerk has stated that attention had only been called to the clauses seeking to put trail cars on the lines and to allow overcrowding on holidays. It was agreed that the General Purposes Committee should consider the bill. In reply to a complaint made by the Council that the repairs to the London United track were considered insufficient, the engineer has stated that the track is in as good a state of repair as could be expected. The Council decided to bring the matter to the attention of the Board of Trade. The London County Council is under an obligation to reconstruct the tramway between Finsbury Park Station and the Manor House terminus of the Metropolitan Electric Tramways for conduit traction by August 2 next, but as that course would entail cutting off the through connection with Moorgate Street, City, the Council are proposing to the local authorities affected that the reconstruction shall be on the overhead system, which would not necessitate the stoppage of the traffic. In order to facilitate dealing with the evening rush traffic from the Victoria Embankment to South London, it is proposed to construct a second shelter a short distance west of the present structure.

NORTHAMPTON.

Adoption of the Birmingham Type of Car

After considering designs of new cars with covered tops and vestibules, the Tramways Committee have decided to provide seven cars with covered tops and vestibules. Replying to questions at a meeting of the Council, Councillor T. D. Lewis, chairman of the committee, said the question of bogie trucks had been considered carefully, but the view was that, having regard to all matters that had to be considered the lighter car was best suited to Northampton. Recently he saw at Preston 100 cars of the type they proposed to order. Those cars were for the Birmingham City Council, so that if Northampton was making a mistake Northampton was in good company.

NOTTINGHAM.

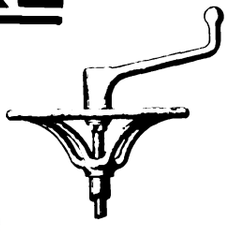
New Cars and Extensions—Prospective Omnibus Service.

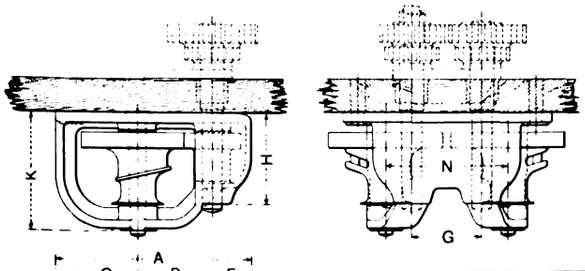
In order to meet the needs of the increasing traffic 20 new cars have been ordered. The Council have agreed to extend the tramways from Derby Road to Wollaton Park, and also on the Sherwood and Carlton Road routes. The schemes have received Parliamentary sanction, and the Derby Road route has been inspected by the managers of the

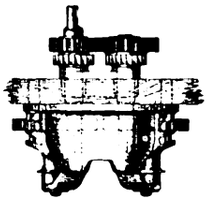
THE "PEACOCK" TWIN BRAKE

The TWIN Brake has been specially designed for use on cars fitted with magnetic track brakes which it is desired to operate by hand should occasion demand.

In this arrangement the wheel and track brake chains are both wound on geared spiral drums placed side by side in one frame. The drums are made right and left handed to correct the reversal of rotation caused by one of them being driven by the second motion spindle geared to the brake mast.







(1) Like all brakes of the "Peacock" IMPROVED type, the TWIN brake is fitted with stops, which prevent the drums from over-running on release;

(2) Stop the drums always at the point from which recovery of slack chain is most rapid; and

(3) Eliminate all idle turning of the handle.

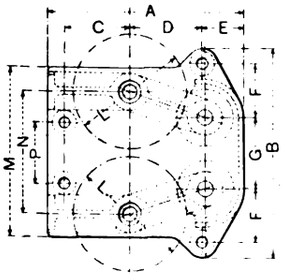


TABLE OF DIMENSIONS.

A	B	C	D	E	F	G	H	K	L	M	N	P	
13	13⅝	4⅜	4½	3	3½	4⅝	5 1/16	7¾	7½	11	8	4	inches
330	346	111	114	76	89	117	148	197	190	280	203	102	millim tres

THE "PEACOCK" BRAKE CO.

27, Clements Lane, LONDON, E.C.

Representatives in FRANCE, GERMANY, SPAIN, BELGIUM, SWEDEN, ITALY, SWITZERLAND, INDIA, JAPAN, AUSTRALIA, NEW ZEALAND, and ARGENTINA.

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Manchester and Leeds tramways, who expressed a very strong opinion that the extension would pay.

YORK.

TRAIL CARS FOR WORKMEN'S TRAFFIC.

The Board of Trade have authorised the use of trail cars on the tramways for workpeople's traffic between 5-30 a.m. and 8 a.m.; for dinner-hour traffic from 11-30 a.m. to 2 p.m.; and also between 4-30 p.m. and 6 p.m.

MR. MURPHY ON THE DUBLIN STRIKE.

Addressing the shareholders of the Dublin United Tramways Company on February 3, Mr. W. M. Murphy, chairman of the company, made some interesting remarks on the recent Dublin strike and the action taken by himself. The following is an abstract of this part of his address:

We meet to-day under very exceptional circumstances. The history of this company has been a continuous record of progress in its receipts and of moderate prosperity in its net results. The set-back the company got on this occasion is due, as you all know, to circumstances without precedent or parallel in this city or elsewhere in the United Kingdom. A certain Mr. Larkin, who claimed to have come with a divine mission, unfortunately selected this city a few years ago as the field of his missionary labours. These labours took the form of attacking one employer after another, making it impossible to carry on any business which attracted his attention except under control and permit of Mr. Larkin. In the course of last summer it became abundantly evident that his ambition to become labour dictator of Dublin would not be fully satisfied until he had brought the Tramway Company under his subjection. It did not appear to me to be to the advantage of the shareholders that Mr. Larkin should control your property rather than directors whom you appointed for that purpose, and I determined that he should not. I found early in July that Mr. Larkin was gathering into his so-called Transport Union many of our traffic men, partly by the remarkable power he seemed to possess over the minds and wills of the Irish working men whom he seduced by extravagant promises, but mostly by the threats and intimidation of his emissaries.

I thought the best way to check Mr. Larkin's evil influence was to confer with the tramway men myself, and accordingly accompanied by Mr. Mooney, Mr. Tresilian, and Mr. Gordon, I met practically all the traffic men at the Antient Concert Rooms soon after midnight on July 19. I addressed them at some length, and everything I told them that night has since come to pass. I pointed out to the men that they had good and much sought-after employment, and I appealed to their sense of loyalty. I warned them of the certain defeat and disaster for the strikers, and that if Mr. Larkin gave the "word of command" for a strike, as he had announced, it would prove to be "his Waterloo." That and every other warning I gave the men that night have come literally true. This meeting was followed by dismissals of some Transport Union emissaries for intimidation, and for assaults on men refusing to join them, and the further recruiting of possible strikers was greatly checked, if not stopped altogether, as the result of the midnight meeting. Mr. Larkin had kindly informed us of the method by which he proposed to paralyse our business. All the cars were to be stopped and the men were to leave them in the street at a certain hour, which no one would know until he gave the "word of command." Now, we conduct a considerable traffic in parcels conveyed in baskets which are carried on the front platform of the cars. These baskets would be promptly looted and their contents scattered about the streets from any cars that would be left derelict under the "word of command," and this I foresaw would greatly embarrass the loyal men in their efforts to restore the service. I found that all the employees of the city section of the parcel department were members of the Transport Union, and were refusing even before the strike to handle goods from "tainted" sources, that is from firms boycotted by Larkin. As I did not choose to have enemies within the gates when he made his threatened assault on the citadel, the parcel business was suspended, except so much of it as was conducted in connection with the railways, and the services of 103 men and boys were temporarily dispensed with, notice being given that they would get a preference on the resumption of the parcel traffic if they had meantime ceased to be members of the Irish Transport Union.

The "word of command" was duly given, as you are all aware, at 10 o'clock on August 26, the first day of the Horse Show, but owing to the loyalty of a large proportion of our men, the attempt to hold up the traffic proved a complete fiasco, and its failure left no resource to Mr. Larkin's followers but violence and outrage, which found vent in the wrecking of tramcars and in brutal assaults on the loyal men in charge of them. I told the men at the Antient Concert Rooms meeting that the strike, if attempted, would not last a day. It didn't last an hour. The stopping of the power and coal supply was greatly relied on by Mr. Larkin. We had, however, provided accommodation at the Ringsend Station to house and feed men there, and to store an ample supply of coal, so that the power supply was never for a moment in danger. Other efforts were made to paralyse the tramways, including the calling off of the road repairing gangs, who were immediately replaced by free labourers, but no impression was made on our defences, and, as I said on a previous occasion, Mr. Larkin, in his efforts to ruin the Tramway Company, was only biting a file. In taking steps to resist the attack on your property it did not occur to me that I was doing anything extraordinary or heroic, and I was therefore surprised to find afterwards the extent to which large employers in the city and at the port were under the despotism of Larkin, and to learn that I appeared to be the first who made a determined stand against his aims to rule the labour position in the city. The tramway fight was then over, and it would be forgotten long before now but for the subsequent action of the general body of employers in withstanding the resort to "sympathetic strikes" and "Syndicalism" which was applied to the whole trade of Dublin. Though the company were amply provided with men after the first few weeks to carry on their full service, it was some time before the cars could be safely run when it became dark, and a good deal of the loss in our receipts was due to this cause. The general strikes and unrest added greatly to our losses, which are probably twice as much as if the disturbances had been confined to the tramways alone.

However, the result was worth all the sacrifice forced on the company. It has proved in a most striking manner the impossibility of "Syndicalism" succeeding under any circumstances if it is boldly grappled with. The net result of Larkinism during the last six months is that, after keeping this city in a state of turmoil and disturbance, and nearly ruining its trade, there is not a single workingman or woman in Dublin whose wages or conditions of employment have been improved in the least degree. So far from bringing any benefit to the workingmen, Larkin's campaign has brought nothing but untold misery on them and their families. I have no feeling of triumph over the utter defeat of the disruptionists, but I have the greatest commiseration for the victims of Mr. Larkin's ambition and their own folly. I get letters every day of the most pitiable character from men whom we should have readily re-employed if they applied in time, but who delayed so long that their places were filled up, and their names can now only be put on a waiting list. Though we have gone through such a trying time, I have some satisfaction in the belief that it will be many a day before another strike takes place in this company. This consideration, however, will not prevent the directors from always giving sympathetic consideration to the just claims of their employees. (Applause.)

Mr. Murphy received hearty congratulations from several shareholders who spoke afterwards.

PATENT WEATHER SCREEN FOR MOTOR 'BUSES.
NO GLASS. Instantaneously opened and closed.
ADJUSTABLE TO ANY DRIVER. NO REFLECTED LIGHTS.
As supplied to the Birmingham Corporation, Sheffield Corporation, and London & North Western Railway Co., etc., etc., etc.
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FOR HIGH-CLASS
CONDENSING PLANT
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THE MIRRLEES WATSON CO., LTD.,
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"AILSA" OILSKINS

with Padded Scyes and Protected Sleeves.
Send for sample of our latest improved pattern.
AILSA OILSKIN CO.
Manufacturers,
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FOR MOTORMEN.
Extracts from Users' Letters:
"Ailsa Coats are best and cheapest we have ever had."
"Motormen's Oilskins supplied by you gave every satisfaction."
"The oilskin coats we now use are entirely confined to the 'Ailsa' manufacture."
"We have tried several makes of Oilskins, but none have been equal to the 'Ailsa' make."
"Past results have been so satisfactory that we have this year decided to place the whole of our order in your hands."

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THE CAMBRIDGE TRAMWAY COMPANY TO BE WOUND UP.

Mr. Justice Astbury, in the Chancery Division of the High Court, on February 3, made an order for the compulsory winding up of the Cambridge Street Tramways Company. This was done on a petition by Cambridge Corporation. The company were incorporated in 1879 and undertook a certain liability for road repairs on the tramway route. In 1892 the Corporation agreed to take over the liability in consideration of the company paying £325 a year. In 1912 default was made in this payment, as the traffic, which is worked by horse cars, suffered from motor omnibus competition For the company it was urged that the Corporation had licensed the omnibuses which caused the reduction in the company's receipts, and it was inequitable that the company should be wound up in respect of this debt, while the omnibuses paid nothing for the use of the streets. The petition should not be granted until Parliament had decided what steps should be taken to make omnibuses contribute to road maintenance. The Corporation had refused permission to the company to electrify the tramways. Mr. Justice Astbury, in making the order, said that the sum due was steadily mounting up He could not keep the petition hanging about till Parliament had made up its mind as to contributions by omnibuses to road maintenance.

UNDERGROUND GOODS TUNNEL IN BUENOS AYRES.

A decree has been published approving the plans of the Buenos Ayres Western Railway relating to the section of its projected undergound goods tunnel comprised between kilometres 0.383.50 and 1.000 This section was excluded from the general approval decreed on March 6 last pending an agreement being arrived at in connection with the junction with the Port lines. The *Review of the River Plate* states that the matter has now been settled and the route approved by the Minister of Finance, whilst the Municipality of Buenos Ayres has likewise appoved an agreement relative to the manner in which the works are to be carried out without prejudicing the appearance of the Plaza in front of Government House Furthermore, the General Railway Board has also approved the plans, so that all obstacles to the execution of the work have now been removed.

PATENT LIST.

Specially abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given below in italics.

APPLICATIONS.

Applications for Letters Patent have been filed :

380 Vacuum brake apparatus—E. S. Luard.
471 Sanding arrangements for railway use—W. E. W. Millington.
720 Car seats—W. Morton.
741 Railway or tramway switches—J. R. Davies.
749 Supports for electric trolley wires—K. von Kando.
769 Vehicle fenders—Y. F. Wittmann.
870 Automatic car couplers—J. Willison.
901 Construction of electric conductor rails, safety guards, and contact shoes for electric traction—J. A. F. Aspinall.
1,003 Reversible seats for tramcars—J. E. Anger.
1,077 Signalling devices applicable to railways and tramways—L. T. Jones.
1,215 Tramway car seats—T. K. Fulton.
1,282 Dummy couplings for air brakes—Knorr-Bremse Akt.-Ges. and G. Ackerman.
1,309 Life-guards for tramcars—W. Philipson, T. W. H. Philipson, and P. C. Philipson.
1,342 Automatic and self-adjusting life-guard for tramcars—S. Cromarty.
1,452 Overhead conductors of electric railways—K. von Kando.
1,522 Motor omnibuses—J. Noad.
1,530 Bogies for railway rolling stock—E. W. Timmis.
1,533 Rails or tracks for tramways and railways—C. H. Clinton.
1,587 Fittings for electrical conduit systems—D. L. J. Broadbent.
1,606 Life-guards for electric tramcars—H. Ezard.
1,614 Rail-track sluing machines—O. Kammerer and W. U. Arbenz.
1,708 Stop-block apparatus for railways—W. H. Barker and S. Berrisford.
1,938 Crossings, points and turn-outs for railways and tramways—W. T. Shimmin.
1,992 Traffic indicator—G. Christie.
2,062 System of suspension for tramway and railway cars—C. Delmez.
2,066 Rail joints—J. W. Stephenson.
2,160 Device for automatically coupling air or steam conduit pipes between railway cars—H. Videbak and N. P. P. Pallesen.
2,432 Electrical signalling—H. O. Burge.
2,445 Apparatus for heating motor omnibuses—H. F. Bolton.
2,455 Automatic brake adjuster for tramway and railway vehicles—R. S. Paterson.
2,586 Electro-mechanical signal apparatus—J. R. Jardine.

SPECIFICATIONS PUBLISHED.

1912.

28,636 Track switches for tramways—Cumming.
28,969 Vacuum brake apparatus—Luard.
28,655 Fare or ticket receiving box—Wright and Tanner.

1913.

259 Devices for operating railway and tramway points from the vehicles—Parrock.
8,725 Tie plates for railroads—Lundie.
16,281 Trucks for tramcars—Curwen *(J. G. Brill Company)*.
18,544 Reinforced concrete beds or sleepers for permanent ways—Rank, Rank, and Rank.
18,742 Reinforced concrete railway sleepers—Sisk.
15,062 Railway or tramway point or switch-operating mechanism—Maschinenfabrik Oerlikon.
20,436 Rail joints—Byrde.
7,213 Trolleys—Drake and Burnett.
17,940 Car trucks—Hewitt.
18,118 Side splash mud-guards for motor omnibuses—Graveley.
22,829 Safety signalling and controlling devices for railways—Cooper.

TRAFFIC RETURNS.

Colonial and Foreign Tramways.

NAME OF COMPANY.	1913. WEEKS ENDING.					1914. WEEKS ENDING.					AGGREGATE.		
	Jan. 4.	Jan. 11.	Jan. 18.	Jan. 25.		Jan. 3.	Jan. 10.	Jan. 17.	Jan. 24.		Wks	1914.	Increase or Decrease.
	£	£	£	£		£	£	£	£			£	£
Anglo-Argentine	57.155	55.588	53.253	53.174	...	58.067	58.200	56.621	55.023	...	4	227.911	+ 8.741
Auckland ... (28 days)	...	...	21.653	...	...	...	...	25.633	...	...	28½	135.538	- 3.874
Brazilian Street ... (month) Mlrs.	47.512	...	...	...	...	57.250	...	...	...	...	22	264.464	+ 65.611
Brazilian Traction	85.114	85.385	85.531	84.639	...	94.493	95.230	95.065	94.026	...	4	378.814	+ 38.145
Brisbane ... ...(month)	25.890	...	...	...	...	29.145	...	...	...	...	52	316.216	+ 61.905
British Columbia ... (month) $	773.741	...	...	...	...	793.219	...	...	...	...	26	4.553.726	+302.902
Buenos Aires Port and City (month)	6.216	...	...	...	...	8.070	...	...	...	...	52	84.259	+ 9.194
Buenos Ayres Lacroze ...(month)	47.188	..	...	...	...	47.624	...	...	...	...	26	272.894	+ 9.337
Calcutta ... ... Rs.	70.718	72.362	66.778	64.288	...	71.942	71.162	69.754	68.040	...	4	280.898	+ 6.752
Cape Town ... ...(month)	14.147	...	...	...	...	14.925	...	...	...	...	—	—	—
Carthagena and Herrerias (month)	3.001	...	...	...	...	2.698	...	...	...	...	52	30.863	+ 4.517
Cordoba ... ...(month)	12.266	...	...	...	...	12.863	...	...	...	...	39	120.313	+ 11.061
East India ... ...(month)	1.842	...	...	...	...	2.046	...	...	...	...	22	9.879	+ 349
Kalgoorlie ... ...(month)	3.206	...	...	...	...	2.907	...	...	...	...	52	34.510	- 3.300
La Plata ... ...(month)	5.862	..	...	...	...	5.679	...	...	...	...	52	61.520	+ 9.344
Lima ... ...(month)	...	...	...	...	...	...	...	...	...	...	—	—	—
Madras ... ... Rs.	(2 weeks) 26.590	(2 weeks)	26.530	...		(2 weeks 29.303	(2 weeks	28.836	...		4	58.139	+ 5.019
Melbourne ... ...(month)	67.500	...	...	...	...	69.000	...	...	...	...	—	—	—
Mexico ... ... (month) $	653.102	...	...	...	...	611.673	...	...	...	...	52	6.949.478	+136.432
Montevideo ... ...(month)	34.483	..	...	...	...	33.309	...	...	...	...	9	63.839	- 267
Para	4.321	3.961	4.120	3.991	...	3.485	3.620	3.121	3.219	...	8	26.801	- 5.305
Port Elizabeth ... ...(month)	4.367	...	...	...	...	4.967	...	...	...	...	—	—	—
Shanghai ... ... $	18.211	20.178	18.232	18.880	...	22.800	23.200	23.400	23.800	...	3	70.400	+ 13.110
Singapore ... ... $	10.135	11.159	11.232	10.996	...	11.357	11.314	11.646	10.994	...	4	45.308	+ 1.786
Toronto ... (month) $	...	...	...	...	...	...	...	...	...	...	—	—	—
Winnipeg ... .. (month) $	361.700	...	...	...	...	379.863	...	...	...	...	52	4.078.694	+313.310

(Continued on page 130.)

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TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1913. WEEKS ENDING.				1914. WEEKS ENDING.				AGGREGATE.		
	Jan. 4.	Jan. 11.	Jan. 18.	Jan. 25.	Jan. 3.	Jan. 10.	Jan. 17.	Jan. 24.	Wks.	1914.	Increase or Decrease.
	£	£	£	£	£	£	£	£		£	£
Aberdeen Corporation ...	1.749	1.644	1.489	1.411	1.640	1.861	1.459	1.371	34	55.383	+ 3.151
Accrington Corporation ...	580	477	440	506	598	553	516	513	42	24.334	+ 2.177
Ayr Corporation	272	197	183	189	276	245	207	210	36	14.133	+ 1.994
Bath Electric	...	855	719	663	830	696	692	640	5	2.028	- 209
Birkenhead Corporation ...	1.285	1.133	1.123	1.116	1.357	1.217	1.142	1.136	43	55.494	+ 5.046
Birmingham Corporation ...	11.490	10.914	11.343	11.362	11.986	12.217	11.842	11.765	43	510.152	+ 42.832
Blackburn Corporation ...	1.367	1.043	966	1.119	1.322	1.298	1.107	1.006	43	56.408	+ 4.942
Blackpool Corporation ...	751	466	426	446	786	572	460	429	42	78.440	+ 12.236
Bolton Corporation ...	3.185	2.316	2.430	2.516	3.314	2.557	2.456	2.486	43	117.885	+ 6.468
Bournemouth Corporation	1.633	1.491	1.506	1.492	1.624	1.492	1.394	1.431	43½	89.952	+ 9.294
Bradford Corporation ...	5.508	4.917	5.104	5.397	5.456	5.360	5.728	5.286	42	253.879	+ 14.879
Brighton Corporation ...	864	792	773	769	838	796	729	658	43	47.116	+ 2.826
Bristol	7.921	7.033	6.871	6.715	8.624	7.734	7.319	6.773	3½	24.153	+ 327
British Electrical Federation	40.076	37.764	36.247	36.948	50.148	48.650	47.109	47.275	—	—	—
Burnley Corporation ...	1.639	1.356	1.503	1.572	1.591	1.618	1.595	1.481	43	73.214	+ 7.797
Burton-on-Trent Corporation	292	272	263	248	299	292	270	260	43	12.721	+ 613
Bury Corporation	1.369	1.145	1.223	1.224	1.361	1.166	1.260	1.155	43	58.008	+ 2.141
Cardiff Corporation ...	2.574	2.476	...	...	2.568	2.580	...	...	41	112.415	+ 11.278
Chatham and District ...	698	1.114	851	843	779	928	795	746	5	2.469	- 339
Chesterfield Corporation ...	259	219	211	237	279	240	237	237	42	11.050	+ 1.233
Colne and Trawden ...	231	192	212	238	229	220	225	227	4	901	+ 28
Cork Electric	324	598	432	413	341	515	434	400	5	1.348	- 94
Croydon Corporation ...	1.683	1.537	1.506	1.448	1.517	1.504	1.459	1.354	42	70.310	- 6.374
Darlington Corporation ...	249	217	217	221	267	237	233	226	43	10.733	+ 980
Derby Corporation ...	934	821	888	875	967	936	875	850	43	42.213	+ 3.815
Dover Corporation ...	219	198	193	193	201	189	171	163	43	10.585	+ 88
Dublin and Lucan ...	...	166	107	106	...	149	110	101	5	361	- 17
Dublin United	5.894	5.734	5.515	5.352	5.057	5.235	4.972	4.808	3½	16.511	- 1.799
Dundee City	1.418	1.388	1.172	1.167	1.333	1.526	1.183	1.194	36	47.435	+ 3.317
East Ham Corporation ...	1.164	1.121	1.129	1.115	986	971	990	1.002	43	44.398	- 2.102
Exeter Corporation ...	328	298	284	276	309	297	269	245	43	14.700	+ 606
Gearless Motor Buses ...	...	...	...	...	491	504	430	399	4	1.554	—
Glasgow Corporation ...	23.078	18.777	18.007	18.802	23.025	19.995	19.324	19.377	34	692.959	+ 48.982
Glossop (Urban Elec. Supply Co.)	126	106	102	125	110	121	111	120	4	463	- 16
Halifax Corporation ...	2.158	1.907	1.604	1.749	2.292	2.000	1.774	1.838	42	89.371	+ 3.221
Hastings and District ...	906	764	715	715	894	720	640	608	5	1.967	- 227
Huddersfield Corporation ...	2.086	1.889	1.920	2.017	2.011	1.968	1.969	2.033	43	91.498	+ 4.624
Hull Corporation	3.264	3.023	3.017	3.089	3.389	3.224	3.249	3.133	43	136.037	+ 6.996
Ilford U.D. Council ...	443	412	395	411	419	428	422	380	42	19.345	- 995
Ilkeston Corporation ...	106	101	114	114	116	119	117	117	44	5.806	+ 39
Ipswich Corporation ...	402	365	362	358	396	369	336	324	43	19.718	+ 673
Isle of Thanet	314	267	274	263	302	276	250	237	17	5.842	+ 450
Kilmarnock Corporation ...	241	151	144	151	247	168	149	151	36	6.416	+ 415
Lanarkshire	1.260	2.685	1.350	1.477	1.571	2.644	1.645	1.667	5	5.956	+ 444
Lancashire United ...	1.591	1.299	1.126	1.267	1.648	1.671	1.401	1.438	5	4.540	+ 615
Leeds City	7.848	7.151	7.137	7.541	7.723	7.807	7.596	7.572	42	347.800	+ 13.841
Leicester Corporation ...	2.726	2.488	2.662	2.674	2.830	2.762	2.696	2.614	4	9.388	+ 465
Leith Corporation... ...	797	636	612	609	777	675	641	628	36	25.830	+ 1.177
Leyton U. D. Council ...	1.288	1.234	1.183	...	1.309	1.270	1.278	...	41½	55.975	- 231
Liverpool Corporation ...	12.690	12.030	12.049	12.144	12.750	12.885	12.322	12.168	3½	43.556	+ 1.445
Llandudno and Colwyn Bay	185	140	140	133	182	144	139	136	8	1.168	- 7
London County Council ...	41.996	42.242	40.825	40.901	40.512	41.678	41.749	40.633	42	1.787.630	+ 5.644
London General Omnibus...	58.065	55.354	52.658	52.657	54.052	54.503	51.237	49.779	4	209.571	- 9.163
London United	5.897	5.644	5.279	5.167	5.609	5.484	5.202	5.069	4	17.231	- 415
Lowestoft Corporation ...	170	147	149	168	183	168	163	157	16	3.107	+ 224
Maidstone Corporation ...	197	164	165	162	202	171	167	159	43	8.783	+ 586
Manchester Corporation ...	17.412	16.293	16.110	16.686	16.812	16.756	16.558	16.348	43	753.826	+ 32.885
Metro. Electric Tramways ...	8.902	8.724	8.431	8.213	8.649	8.382	8.271	8.035	4	26.969	- 743
Nelson Corporation ...	199	157	181	183	218	181	185	201	43	9.011	+ 521
Newcastle-on-Tyne Corporation	4.879	4.260	4.229	4.523	5.132	4.816	4.875	4.751	43	211.206	+ 19.074
Newport (Mon.) Corporation	770	707	696	729	745	740	692	673	43	33.075	+ 2.346
New St. Helens and District	862	655	604	633	821	723	683	672	30	24.617	+ 2.317
Northampton Corporation...	573	500	504	519	587	522	503	483	43	24.703	+ 1.459
Nottingham Corporation ...	3.261	3.087	2.917	3.115	3.463	3.130	3.217	3.122	42½	142.538	+ 6.234
Oldham Corporation ...	2.008	1.928	1.971	1.938	2.085	2.085	2.071	2.061	44	97.117	+ 6.827
Portsmouth Corporation ...	2.029	1.873	1.840	1.691	1.933	2.015	1.697	1.616	43	97.752	+ 6.302
Preston Corporation ...	854	794	759	777	857	754	749	724	43	37.835	+ 2.178
Provincial...	1.701	1.636	1.618	1.571	1.762	1.693	1.641	1.590	16	28.760	+ 1.671
Reading Corporation ...	727	625	626	650	745	665	657	590	42½	29.768	+ 2.069
Rochdale Corporation ...	1.544	1.327	1.356	1.438	1.501	1.415	1.462	1.425	43	68.877	+ 2.836
Rotherham Corporation ...	833	740	835	860	1.022	930	957	989	43½	43.811	+ 9.235
Salford Corporation ...	5.270	4.626	4.754	4.822	5.165	4.892	4.935	4.829	43	225.229	+ 10.084
Sheffield Corporation ...	7.479	6.735	6.938	7.039	7.546	7.295	7.181	7.232	43	322.455	+ 23.857
Southampton Corporation...	1.198	1.190	1.199	1.179	1.026	1.187	1.173	1.106	42	56.202	+ 3.111
Southend-on-Sea Corporation	657	577	523	549	648	648	609	607	43	40.571	+ 6.938
South Metro. Tramways ...	853	760	721	684	1.043	982	948	905	4	3.155	+ 784
South Shields Corporation	723	601	631	614	780	643	650	658	43	31.004	+ 3.568
Sunderland Corporation ...	1.467	1.196	1.217	1.274	1.595	1.283	1.270	1.357	43	62.289	+ 5.735
Swindon Corporation ...	181	147	142	143	169	136	158	134	42	7.069	+ 400
Tramways (M.E.T.) Omnibus Co.	...	...	...	...	7.934	8.266	7.745	7.484	4	27.161	—
Tyneside Tramways and Tramroad	430	505	355	412	508	459	422	446	3	1.328	+ 55
Wallasey Corporation ...	1.075	1.012	984	988	1.114	1.127	1.059	1.018	43	52.378	+ 4.707
Walsall Corporation ...	597	584	585	605	636	596	579	577	4	2.043	- 75
Walthamstow U.D. Council ...	684	638	623	629	701	695	658	628	43	32.060	+ 1.191
Warrington Corporation ...	469	430	428	435	465	...	...	...	40	17.732	+ 473
West Ham Corporation ...	2.746	2.687	2.616	2.651	2.635	2.645	2.605	2.489	42½	115.922	+ 3.708
Wigan Corporation ...	1.534	1.292	1.200	1.362	1.570	1.379	1.385	1.397	42½	63.524	+ 5.932
Wolverhampton Corporation	1.005	962	1.007	986	1.013	1.030	953	952	44	47.222	+ 2.285
Yorkshire (West Riding) ...	1.443	1.080	1.184	1.316	1.324	1.336	1.368	1.381	4	5.409	+ 381

Electric Railways.

NAME OF COMPANY.											
Central London	5.595	5.512	5.780	5.500	5.239	5.229	5.415	5.358	4	21.241	- 1.146
City and South London ...	3.169	3.020	3.222	3.107	3.056	2.879	2.948	2.957	4	11.840	- 678
Liverpool Overhead	1.680	1.678	1.577	1.609	1.713	1.742	1.672	1.634	4	6.761	+ 217
London Electric	14.810	14.995	15.420	14.680	15.185	14.675	15.300	14.765	4	59.925	+ 20
Mersey	2.328	2.224	2.266	2.191	2.286	2.267	2.248	2.195	4	8.996	- 13
Metropolitan	16.813	16.657	16.798	16.702	18.418	18.212	18.231	18.309	4	73.170	+ 1.607
Metropolitan District	13.230	13.360	13.579	13.283	13.346	13.220	13.476	13.007	4	53.049	- 403

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officials and the principal particulars relating to each undertaking.

The directory is revised as occasion requires, and is the most up-to-date and comprehensive list published.

The Tramway & Railway World can be obtained, post free, at the following rates:

For the United Kingdom—
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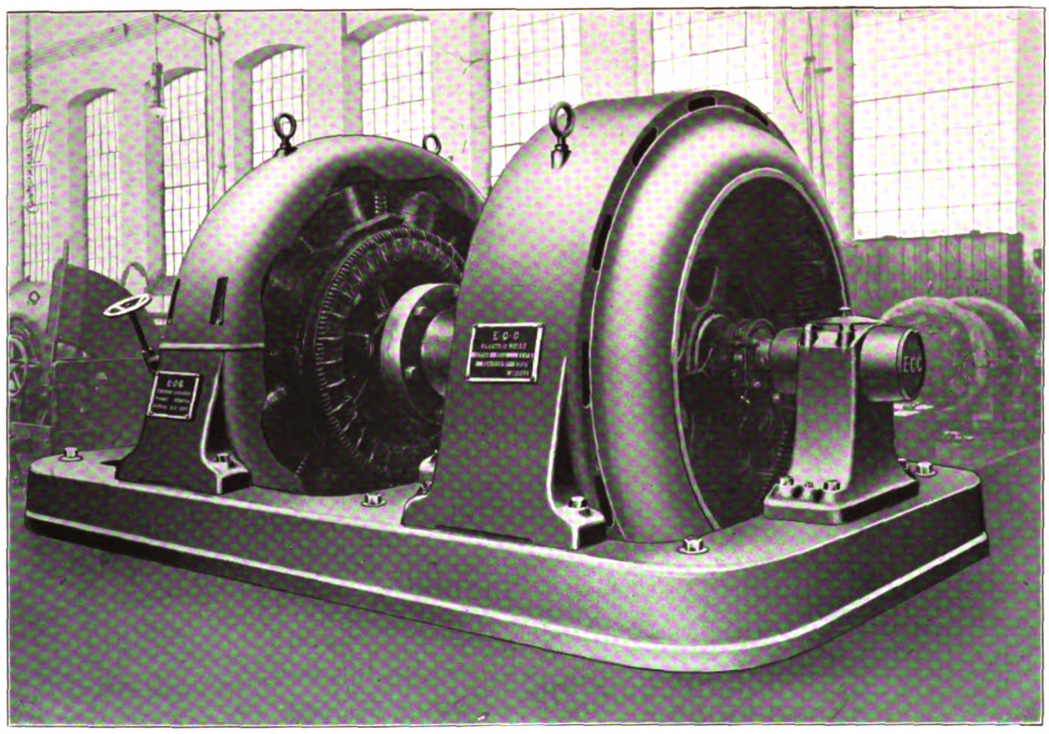
SWITCHGEAR

OF EVERY DESCRIPTION.



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BRITISH ALL BRITISH.

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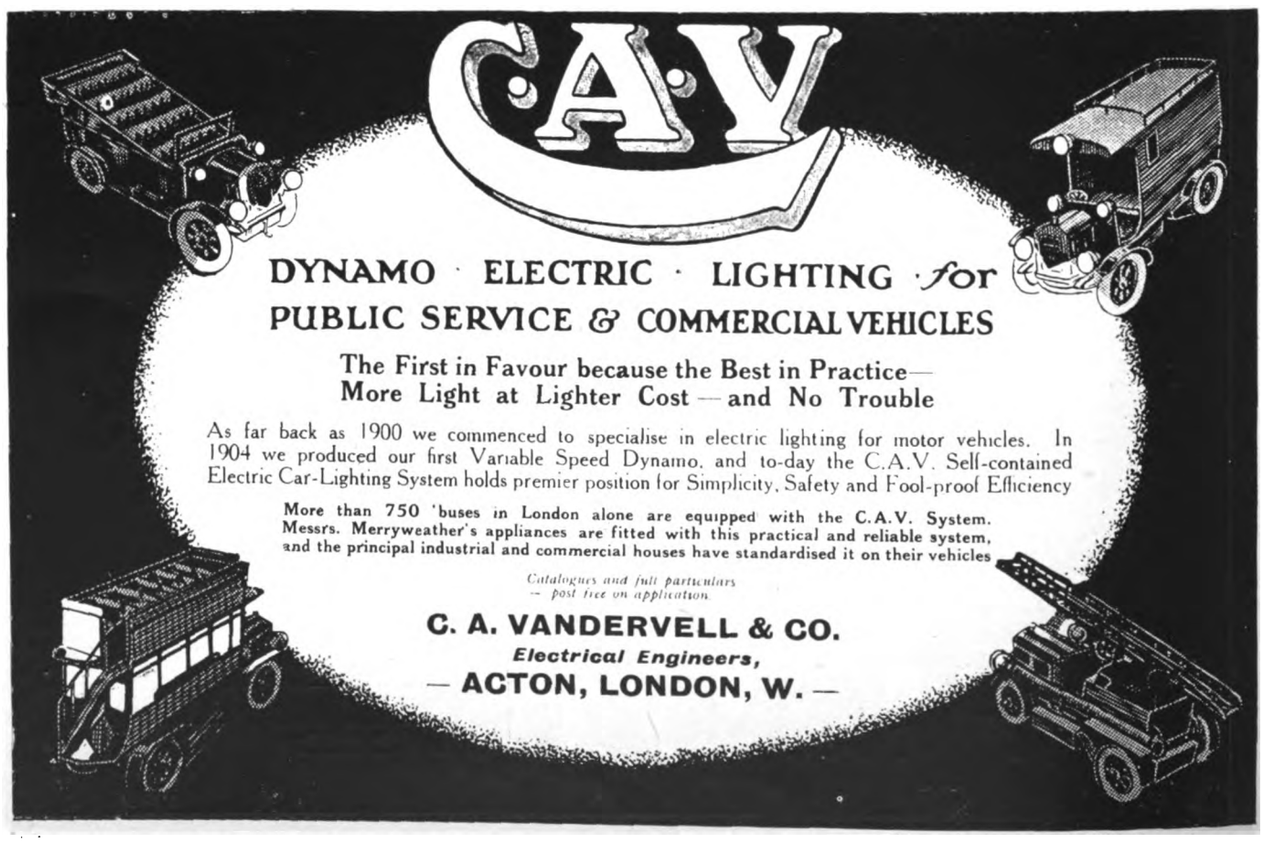
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The First in Favour because the Best in Practice—
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As far back as 1900 we commenced to specialise in electric lighting for motor vehicles. In 1904 we produced our first Variable Speed Dynamo, and to-day the C.A.V. Self-contained Electric Car-Lighting System holds premier position for Simplicity, Safety and Fool-proof Efficiency
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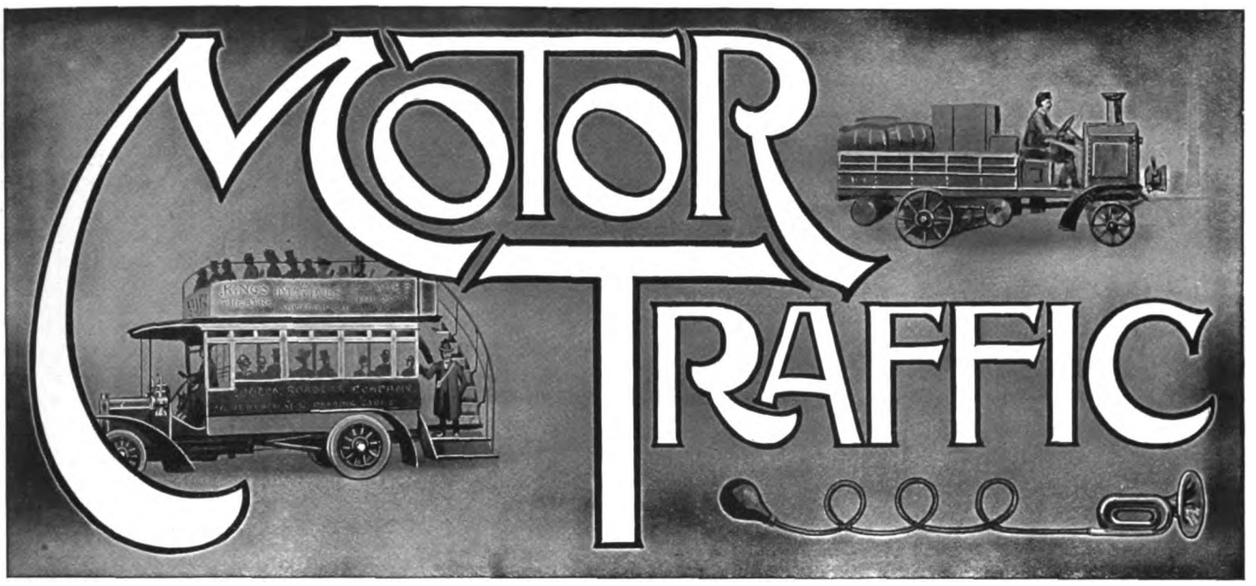

Regarded from the point of view of the char-a-bancs alone there was ample justification for the holding of the motor exhibition at Manchester at this period of the year. Originally, the show of commercial and industrial vehicles was to have taken place in the City Hall concurrently with the pleasure car exhibition in the Rusholme buildings, but the destruction of the latter necessitated the two displays being made in different weeks. The holding of a commercial show in the North proved popular with the great majority of the trade, although the smaller area of the hall, in comparison with Olympia, caused each firm's exhibits to be restricted to fewer machines. That there were 36 exhibitors of petrol and steam vehicles, and 23 firms displaying tires, chains, and other accessories, is an indication that the heavy car department is becoming one of the leading industries of the country. At no previous show has the char-a-bancs constituted so prominent a feature, the explanation being that many manufacturers had completed some of the orders received for the summer season. Viewed both as regards the artistically-designed bodies and the high finish of the chassis, the char-a-bancs now rivals the private car of the most luxurious type. The increased output does not imply a lower selling price for the best types. Indeed, the tendency is markedly upward owing to the competition in excellence, while the use of the vehicle is extending to all-the-year-round traffic. This is due to the ample means of protection from the weather now provided by the hoods. The perfecting of this appliance, which can easily be extended and closed, is also increasing the utility of the toast rack type of car used on a number of tramways for summer traffic. The latest type of hood will be seen on the cars that are to be introduced on the Southend tramways this year. The road char-a-bancs is now commonly used for long-distance football traffic, and every year witnesses an increasing number making journeys of from 60 to a 150 miles to the great race meeting on Epsom Downs.

Tramway managers are deeply concerned in the development of char-a-bancs traffic, for it has already become a competitor with interurban systems. Notable examples last summer were the Isle of Thanet and the Southport District Tramways. On both of those lines the directors were obliged to adopt these vehicles in order to protect their own interests, and they contemplate introducing additional conveyances this year. During the past few months we have pointed out the importance to tramway companies of extending the limits of their operations by the formation of allied undertakings, for the purpose of providing their districts and others contiguous thereto with road motor vehicles for both passengers and goods. This step has been taken by the Gateshead, Jarrow, and Tynemouth companies, and by the three companies operating outside of Glasgow. The importance of other companies following the example is indicated by an enterprise that has been inaugurated for the purpose of providing motor facilities for Northumberland. There the new undertaking, known as the Middlesbrough Motor Transport Company, intends to cater not only for passenger, goods, and fish services, but for the pleasure-seekers of Cleveland and south-east Durham. This bold move has been made notwithstanding that the tramway company serving Middlesbrough, Stockton, and district had made arrangements to run motor omnibuses next spring. Judging by the tone of a communication of the tramway company to the newspapers, the management appear to resent any departure by the local authorities from recognition of that company as the transport undertaking of the district. Experience elsewhere shows, however, that some municipal bodies are bent upon facilitating competition, even though at the same time an injustice may be done to established interests. The only practical course open to the latter is to be found in the recognition as early as possible, and on a sufficiently comprehensive scale, of the fact that a large number of the public prefer road motors to rail cars, even though the presence of the former entails calls upon the ratepayers for the provision of improved roads, and the payment of a rate to make good deficits on municipal tramways. That lesson has been long enough enforced by the traffic rivalry in the metropolis, and given an opportunity, road motors will bring about a similar result elsewhere.

As yet, no claimant has secured the prize of one thousand guineas offered by the Society of Motor Manufacturers and Traders for a home-produced petrol substitute. It is reported that Sir Boverton Redwood, the referee, has not found any of the substitutes to be deserving of the award, and that there were 37 claimants, representing eight different countries. Apparently there is no time limit, but the hope of securing a substitute is not great when one considers the attention devoted to the subject since petrol became an expensive fuel.

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MOTOR TRAFFIC.

Some tangible results have, however, emanated from the outcry of the past two years. A company, supported by motorists as shareholders, are exploiting an oil field in Eastern Europe, and another company, also constituted of car owners, have embarked on the manufacturing of a new fuel at works in London. A great advance has also been made in the use of benzol, a blend of which is to be obtained at sixpence per gallon in quantities of 40 gallons. Benzol, by the way, is coming into use for rail motors. As will be seen from a description published elsewhere in this issue, its latest application is to the train recently made for the Khedive of Egypt. Another substitute is announced from Brussels, consisting of a chemically-obtained solution of naphthaline to which fatty oil is added. Tests of this are reported to have been made by the London General Omnibus Company. Now that for the purposes of the Navy the Government are interested in the question of a home-produced fuel in the form of alcohol, motor owners may look with some confidence to the work just entered upon by the Alcohol Motor Fuel Committee formed by the Imperial Motor Transport Council, in accordance with the desire of upwards of 200 delegates at the Conference held last year. That council comprises representatives not only of motoring interests, but of Government departments interested in the improvement of transport facilities, and the Governments of the Dominions and Colonies. Another aspect of the question is likely to arise in the present session of Parliament. At the instance of the London cab drivers' representative, the Labour Congress, held recently in Glasgow, directed their representatives in the House of Commons to press the Government to grant an inquiry into the control, management, and cost of oil fuel. The cab drivers complained that owing to the "cornering" of the fuel by two companies they had to lose £60,000, and engage in a long strike to fight the masters in their attempt to raise the price of petrol to the men. What the attitude of the Labour party is likely to be may be gathered from the statement of their leader, that Australia, after adopting a minimum wage, had to go further, and fix the price of certain commodities.

Compromises are rarely satisfactory to either participant, and the resolutions in regard to the control of street traffic recently passed by the London County Council are not likely to prove exceptions to the rule. Being avowedly a compromise, the proposal which they seek to establish may, however, have a better chance of being carried into effect by Government. They are clearly an attempt to arrive at a fair and reasonable settlement of a difficult problem, and they should offend no one. On the one hand, the majority of members of the County Council have hitherto adhered to the recommendations of the Royal Commission on London Traffic in favour of the establishment of a Traffic Board with very wide powers. On the other hand, a minority of the Council, backed up by H.M. Government, have objected to the constitution of any such Board. The County Council have now, by a large majority, accepted the principle of constituting a new Traffic Branch of the Board of Trade, but they insist that that Branch should have executive powers and that it should be the body to make by-laws. They propose that the various local authorities should be enabled to recommend the Traffic Branch to make by-laws, but that the local authorities themselves should have no controlling power. It has, of course, been obvious all long, except to those obsessed with the idea of municipal control, that no satisfactory by-laws of universal application for the whole metropolis could be looked for if several County Councils, and possibly two or three County-borough Councils, had each the power to make by-laws for their own areas. It was also tolerably absurd to suggest that County Councils, such as those of London and Middlesex, which possess great tramway systems, should be authorised to make traffic by-laws for the regulation of omnibuses which compete with the tramcars. The whole of the circumstances will be better met if the present County Council proposals are carried out. The Traffic Branch will consist of a body of experts appointed for a period of years. They will act in a judicial capacity, and will consider all recommendations and objections brought before them, and, if necessary, will hold inquiries. If this scheme is adopted it may, in course of time, lead on to the larger proposals of the Royal Commission, under which a Traffic Board would deal with railway traffic, with the formation of new roads, and with schemes of co-ordination, as well as with the matters which it is proposed should be allotted to the new Traffic Branch of the Board of Trade.

MUNICIPAL SERVICE VEHICLES.

The Education Committee of the London County Council have hired a 1-ton motor van with driver from Thomas Tilling, Limited, at £460 a year for three years, excess mileage over 15,000 miles a year to be paid for at the rate of 3d. a mile. The vehicle is to be utilised for conveying reading books from school to school. The same committee have decided to inspect ambulance vans offered by Thomas Tilling, Limited, Sidney Straker and Squire, Limited, and The National Motor Cab Company, with the services of a driver, for the conveyance of physically defective children. A selection of one van will be made, and the Committee anticipate that the motor vehicle will replace three of the four horse vehicles now in use for the conveyance to the special school of such children in the Plumstead, Eltham, and Woolwich districts.

On January 28 a committee of the London County Council, accompanied by Mr. Cyril Cobb, the chairman of the Council, and Lieutenant Sladen, the chief of the fire brigade, inspected three ambulance vans with a view to making a further report on the question of establishing a motor ambulance service for the metropolis. The vehicles comprised the ambulance operated by the Hampstead and North-West London Hospital, towards which the Council gives a subsidy, and ambulances submitted by Thomas Tilling, Limited, and the Daimler Company. The price of the latter company's vehicle was said to be £1,025, and it is fitted with electric light and water. Afterwards the committee went to the Guildhall of the City of London Corporation, and witnessed a surprise call of one of the Corporation's electric ambulances. In four and a half minutes an ambulance from the Bishopsgate station arrived, despite the traffic of the city being at its height.

It was stated at a meeting of the London County Council on January 20 that the chassis of the motor car which the Council had placed at the disposal of the chairman was of French manufacture and the body English. Mr. Gray, chairman of the General Purposes Committee, added that the car would be recognisable by the "very serviceable and not inelegant uniform worn by the driver."

Breakdown of Vehicles on London Tramways.—The Roads Improvement Association has asked the Home Office to amplify the proposed by-law, made by the London County Council, in regard to the breakdown of vehicles in public thoroughfares, to provide that no offence shall be committed if an accident is due to a projecting or defective tramrail, conduit, or inspection hole cover, or any other wrongful defect in the highway.

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MOTOR TRAFFIC.

"ALLEN" TYPE OF OMNIBUS.

PROGRESS OF LONDON AND PROVINCIAL SERVICES.

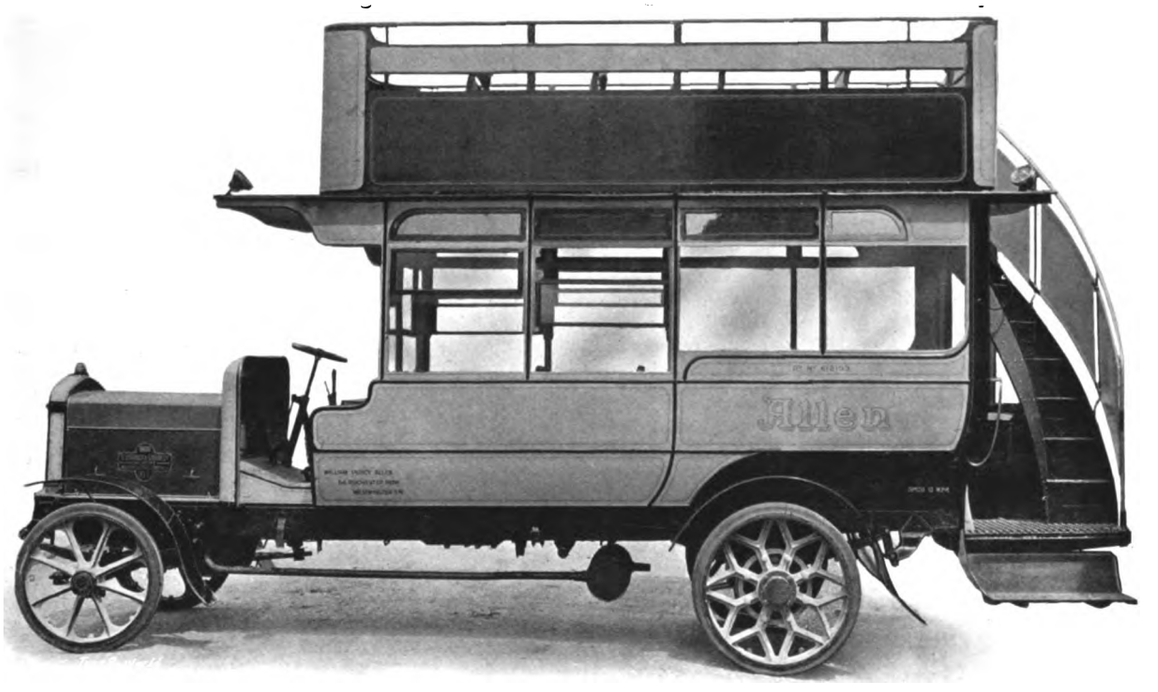
In concluding a description of the "Allen" omnibus, published in THE TRAMWAY AND RAILWAY WORLD for July 10, 1913, we remarked that "it is safe to say that in appearance the new vehicles will be the most distinctive on the London streets." The progress which the Allen Motor Omnibus Company has since made not only in London, but in the country, affords proof of the correctness of the foregoing statement. In the metropolis the enterprise has succeeded in the face of an opposition that would probably have extinguished an ordinary venture. The fact that the Allen Omnibus Company have "made good" is but another proof that the public are not slow to show appreciation of an improved means of transit.

The Allen vehicles, decorated in primrose yellow relieved with black, run on the Liverpool Street to Victoria route, and although accommodating the usual number of passengers, these conveyances possess an appearance most pleasing to the eye. This feature should free them from the criticism that has been levelled at omnibuses by a Member of Parliament, who fears disfigurement of the countryside as the result of the extension of motor services outside of the cities. Moreover, the Allen vehicles are light as well as the reverse of cumbersome, the total weight being slightly less then the 3½ cwts. comprised in the regulations of the public carriage department of the Metropolitan Police. This has been achieved as the fruits of the experience of the builders of the bodies, Messrs. Christopher Dodson, Limited. By the use of the Dodson patent crossbar the weight of the bottom framing is reduced, while retaining the strength needed for public service vehicles.

All the Allen omnibuses running in London are mounted on the new "C.O." type of chassis, with live axle introduced by Straker-Squire, Limited, of London, which was fully described in our issue of July 10 last. One of the first questions put to Mr. Percy Allen, of the Allen Motor Omnibus Company, by a representative of this journal who recently called upon him at the company's London office, 296, Vauxhall Bridge Road, related to the working cost of the vehicles per mile. The reply was that the figures totalled just over 7d. per mile. This is the amount generally accepted for the best vehicles working in the metropolis, and is testimony to the excellence of the Straker-Squire chassis. Doubtless equally good results will be achieved with the Daimler, with which several bodies ordered for provincial service are to be fitted. The Daimler has now been running for over a year under Metropolitan conditions for the Metropolitan Tramways Company, and its costs will be anticipated with interest in the first annual report of this branch of the allied transport companies.

Before his entry into the London traffic Mr. Allen had had no experience of passenger transport, but he had been connected as a director with the motor side of Bean's Express Delivery Company. He now finds that a large number of City people are interested in the progress of his venture, which is a private company. There is no cutting of fares: the Allen Company rely upon the greater comfort afforded by their vehicles. Mr. Allen decided that that was the only way in which an independent company could hope to obtain a foothold. One improvement is to be found in the arrangement of half of the seats of the interior to face the back of the driver. This enables passengers to obtain a view of what is going on in the street without having to take the faces of other passengers within the scope of their vision, and it also removes the annoyance of being stared at by persons opposite.

The London service was inaugurated in January of the present year, six vehicles running on the route already named. Since the original omnibus started at Farningham, Kent, nine months since, it has been joined by three others from the works of two firms previously referred to. Experience gained there has resulted in the plush upholstery of the interior being superseded by morocco leather. The latter is more expensive, but it does not accumulate dust, and can be kept clean more easily. A slight modification has also been made in the design of the body, which is, of course, registered. Thirty-five omnibuses are now in course of construction for London and the provinces. Four are running at Farningham, and two at Sittingbourne, the latter having been put on six months ago. By the time the summer arrives it is expected that the increased traffic to be secured at that season will require several additions to those fleets. Another service has been established at Kidderminster, where half a dozen omnibuses have been at work during the last three months. Negotiations are in progress with a number of other local authorities. In every case the Allen Company have been welcomed, not only for the sake of their unique conveyances, but for the advantages which a public motor service confers upon the locality.



The Allen Type of Omnibus now in Service in London.

The selling price of the Allen body is £210, and the chassis about £520, to which sum £50 has to be added for tyres. If fitted with a C.A.V. electric lighting set there is an additional charge. On a busy Saturday night in the provinces an omnibus has carried as many as 60 passengers. The life of the vehicle is calculated as five years. The company will shortly introduce their first char-a-bancs, modelled on the Allen design. It is hoped to have a number of these running in seaside towns on the south coast in the summer. This type of conveyance will be very costly, but the recompense is that the best vehicle secures most patronage.

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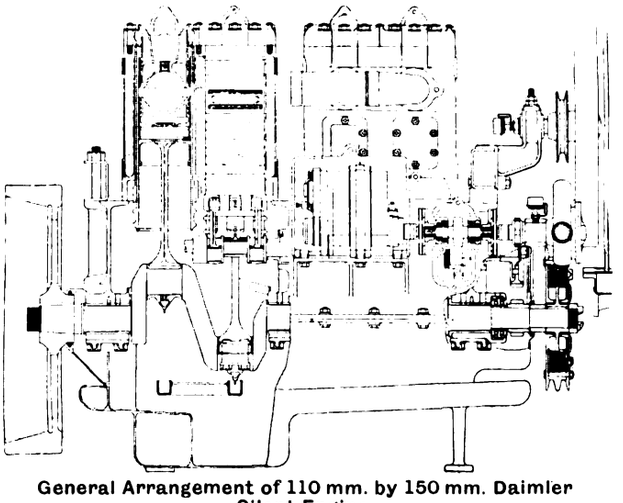
MOTOR TRAFFIC.

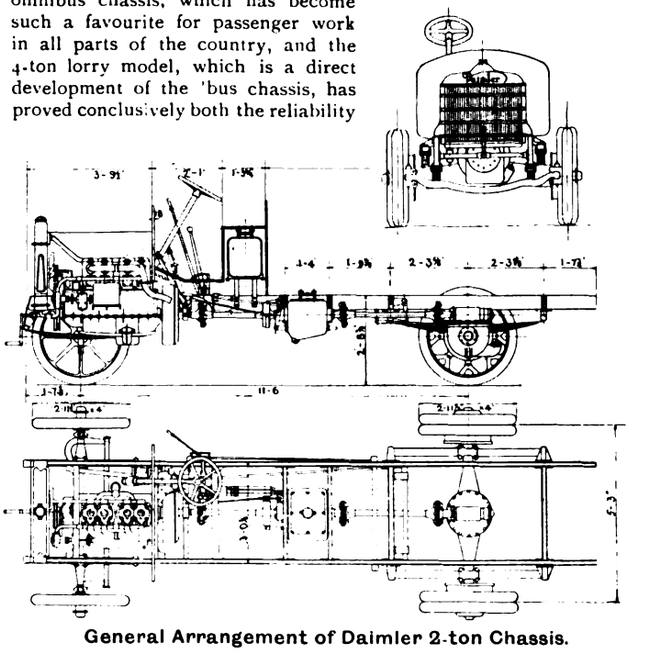
NEW DAIMLER MODELS.

Two important additions have just been made to the range of industrial models now manufactured by the Daimler Company at Coventry, and these were seen by the public for the first time at the North of England Motor Show at Manchester, where they excited much interest.

For several years the Daimler Company has recognised that the motor-driven commercial vehicle would, in due course, oust horse haulage in practically every department of road transport, and in consequence very extensive developments have been made at the Coventry works during the last few years, in order to cope with the demand that already exists, and is rapidly increasing, for commercial motor vehicles of every description. The Daimler Company is particularly well-equipped, both in experience and in plant, to cope with this comparatively new branch of automobile engineering, and already the good results of its enterprise are evident in the striking success attained by Daimler passenger vehicles used in the omnibus services of London, Manchester, Birmingham, Sheffield, Halifax, Rotherham, Leeds, and other progressive centres.



General Arrangement of 110 mm. by 150 mm. Daimler Silent Engine.

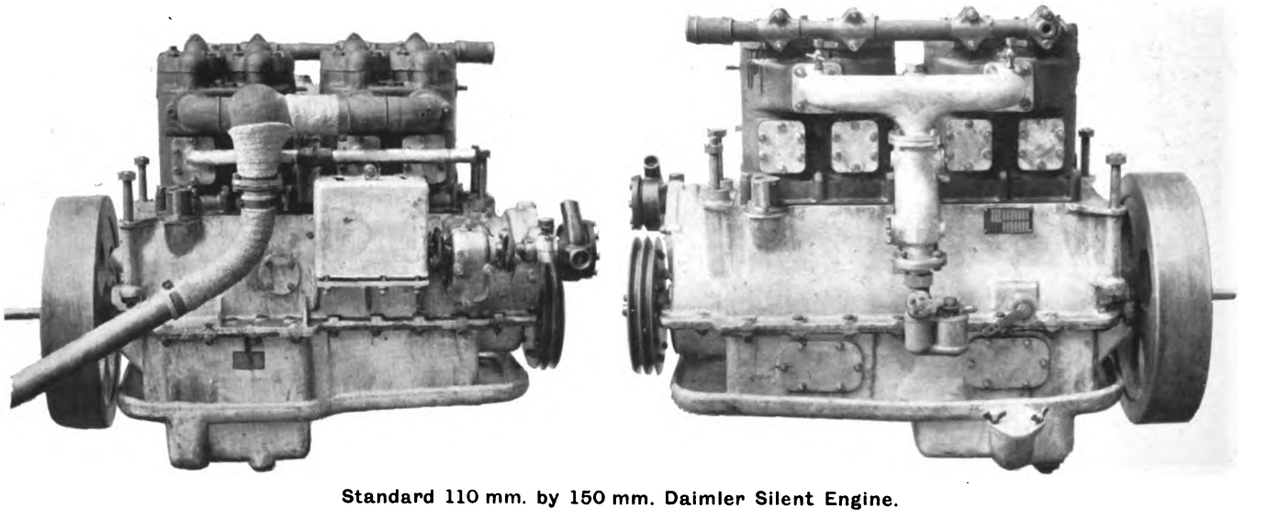


General Arrangement of Daimler 2-ton Chassis.

Regarded from the engineering standpoint, the production of a satisfactory commercial vehicle is a proposition that demands the careful consideration of the conditions peculiar to freight and passenger transport. Under the influence of forced progress, enormous strides have been accomplished in detail of design, and the Daimler commercial vehicle is, without question, a most satisfactory example of automobile construction, that has very successfully upheld the company's good name for reliability in hard service.

The new models are designed for net loads of five tons and two tons respectively, and complete the range of machines provided for in the company's original programme.

The wide experience the company has gained with their 3-ton omnibus chassis, which has become such a favourite for passenger work in all parts of the country, and the 4-ton lorry model, which is a direct development of the 'bus chassis, has proved conclusively both the reliability and economy of the sleeve-valve engine. It was, therefore, to be expected that the "Silent Knight" engine would be a standard feature throughout the complete range. At the invitation of the Daimler Company, we had an opportunity of examining the first examples of the new models at their works at Coventry prior to their being dispatched to the show. Although at the time of the visit the two chassis were in show trim we were informed that each had recently passed through most severe road tests with a considerable overload and had given complete satisfaction, notable features being the remarkable facility with which the vehicles were handled on the road and the silent running under all conditions.



Standard 110 mm. by 150 mm. Daimler Silent Engine.

(40 H.P. at 1,000 revolutions per minute, as used by the London General Omnibus Company.)

From our illustrations it will be seen that the general principle of the two new models are very similar, and conform in the main to the design of the already well-known chassis, the standard features in these being the sleeve-valve engine, the Lanchester type worm-driven axle, and the short propeller shaft fitted with flexible leather joints. The 5-ton machine has a 4-cylinder engine, 110 mm. bore with 150 mm. stroke, while the cylinder dimensions of the smaller engine are 95 mm.

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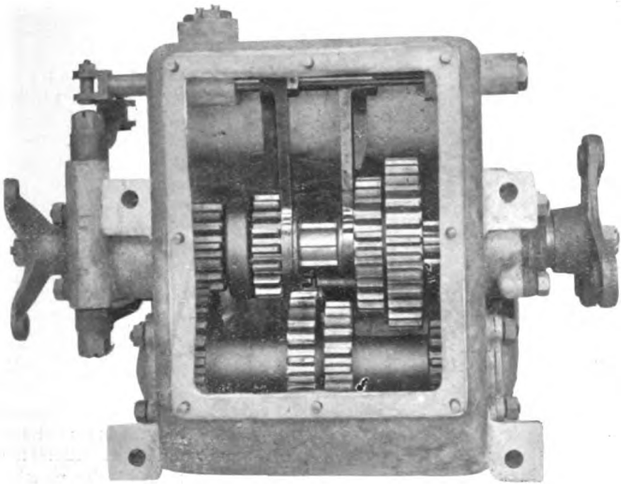
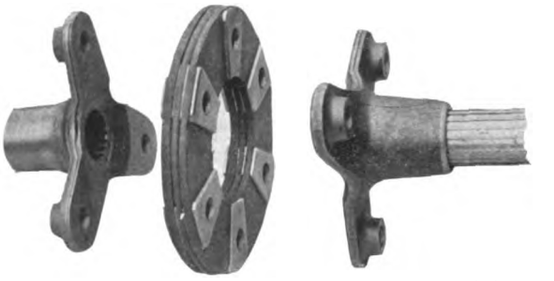
MOTOR TRAFFIC.



Daimler 4-Speed Spur-Wheel Gear Box.

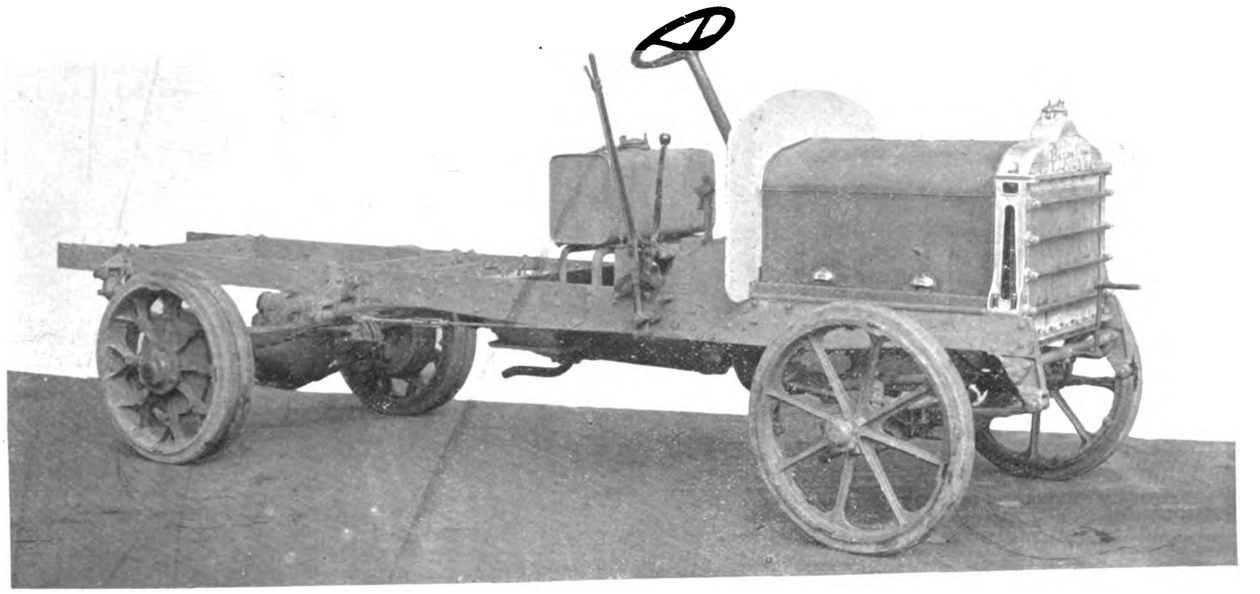
bore and 125 mm. stroke. The former developing 40 H.P. at 1,000 revolutions per minutes, and the latter 30 H.P. at the same engine speed.

In each case the engine is mounted upon a channel section cross member, all parts needing inspection being readily accessible. A noteworthy alteration in the engine design is the substitution of steel piping in place of copper throughout the chassis, with the exception of the



Detail Construction of Daimler Universal Joint.

radiator which is of cast aluminium. Both machines are fitted with a four-speed spur-wheel gear box of extremely compact pattern; the change-speed gearing is of the sliding type with extra wide teeth. A rocking hand-lever working in a gate operates the gears by means of three selector rods. A locking arrangement, controlled by a small lever attached to the gate, which the driver has to depress with his heel before he can operate the reverse speed gear, is one of the small but by no means unimportant improvements which have been



New Daimler 2-Ton Chassis Exhibited for the First Time at the Manchester Show.

DETAILS OF PERFORMANCE OF 3, 4, AND 5-TON DAIMLER CHASSIS UNDER VARIOUS CONDITIONS.

Chassis.	No. of Speeds.	Total Gear Reduction.	Speed in m.p.h.	Total Tractive Pull in pounds.	Useful Tractive Pull in pounds.	Total Wind Pressure in pounds.	Maximum Road Resistance on Level.	Maximum Gradients Climbable. Road Resistance 45 lb. per ton—Asphalte, Smooth Wood.	Road Resistance 60 lb. per ton—Good Macadam.	Road resistance 90 lb. per ton—Veryrough Macadam.	Road resistance 200 lb. p. ton—Soft Gravel.	Road resistance 300 lb. per ton—Rough Grass Land
							Pounds per ton.					
3-ton: gross weight, 6·5 tons = 14,560 lb.	1st	36·1 to 1	3·26	2,920	2,920	N.*	450	1 in 5·5	1 in 5·75	1 in 6·25	1 in 9	1 in 15
	2nd	18·27 ,, ,,	6·44	1,480	1,472	8	226	1 in 12·3	1 in 13·5	1 in 16·4	1 in 84	—
	3rd	10·75 ,, ,,	10·95	870	846	24	130	1 in 26	1 in 34	1 in 56	—	—
	4th	7·25 ,, ,,	16·21	675	623	52	96	1 in 44	1 in 62	1 in 380 (Flat)	—	—
4-ton: gross weight, 7·75 tons = 17,360 lb.	1st	41·2 ,, ,,	2·85	3,340	3,340	N.*	430	1 in 5·8	1 in 6	1 in 6·5	1 in 9·7	1 in 17
	2nd	20·75 ,, ,,	5·67	1,680	1,674	6	216	1 in 13	1 in 14·3	1 in 18	1 in 140	—
	3rd	12·2 ,, ,,	9·65	990	972	18	126	1 in 27·7	1 in 34	1 in 63	—	—
	4th	8·25 ,, ,,	14·28	770	730	40	94	1 in 45	1 in 65	1 in 520 (Flat)	—	—
5-ton: gross weight, 8·9 tons = 19,936 lb.	1st	46·1 ,, ,,	2·54	3,740	3,740	N.*	420	1 in 6	1 in 6·2	1 in 6·8	1 in 10	1 in 18·6
	2nd	23·3 ,, ,,	5·05	1,890	1,885	5	212	1 in 13·4	1 in 14·8	1 in 18·4	1 in 190	—
	3rd	13·7 ,, ,,	8·59	1,110	1,095	15	123	1 in 28·5	1 in 35·5	1 in 68	—	—
	4th	9·25 ,, ,,	12·74	860	828	32	93	1 in 46·5	1 in 68	(Flat)	—	—

* Negligible.

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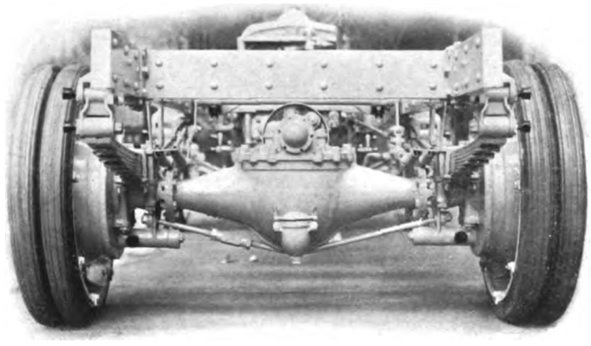
MOTOR TRAFFIC.

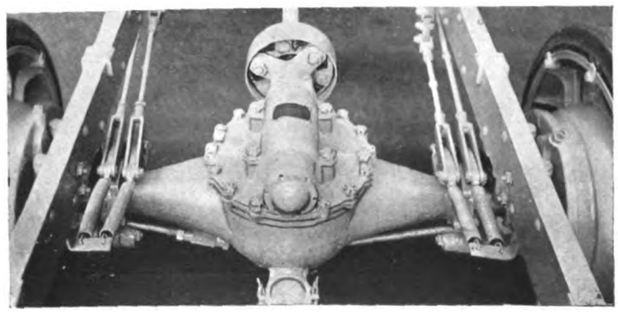
introduced. The 5-ton model has dual ignition, and in common with all the Daimler commercial vehicles is fitted with the Solex carburettor. A twin-groved belt pulley is attached to the crank shaft for the purpose of driving a dynamo for electric lighting purposes. The radiator is of the Daimler standard type with cast aluminium headers and tubes. It is of a most simple and efficient type, and has a cast aluminium grid guard that adds considerably to its appearance. The radiators are mounted on the frame by means of spring bolts set into special pockets cast into the brackets of the radiator; by this method they are protected from shocks and undue stresses.

The Daimler transmission arrangements embody a system that has been found most satisfactory in practice, and contributes largely to the easy running of the vehicles; at the same time each component part is so designed that it can easily be dismantled without disturbing any other part of the machine. The clutch is of pressed-steel cone type, of large diameter, with a lining of special material. The short



Daimler New 2-Ton Chassis Rear Axle.

propeller shafts between the clutch and gear box, and between the gear box and back axle, are each fitted with leather disc universal joints, which have light steel covers. Those at the rear end are so arranged that they can slide on the splined ends of the shafts, and so accommodate themselves to the movements of the back axle. The Daimler-Lanchester worm-driven axle consists of a main steel casting supported with tie rods underneath, and a cast-steel cover to which the worm wheel and the differential gear is fixed. By this arrangement it will be seen that the whole of this mechanism can be withdrawn bodily by merely removing a few nuts after withdrawing the driving axle and disconnecting the rear universal joint. In order to ensure the exact position of the cover and its mechanism, a spigot fitting tightly into a machined opening in the axle casing is provided; this also relieves the strain on the studs and nuts. A feature of the new design is the further increased braking surface. Both sets of brakes are arranged to operate on the back wheels direct. They have separate enclosed drums, and are of the internal-expanding



Arrangement of Daimler Drive with Overhead Worm.

type, the shoes being steel lined. The cross shaft of the brake lever is now placed in line with the front spring brackets. This arrangement counteracts the tendency for the brakes to become out of adjustment, due to movement between frame and axle, caused by the varying load of the vehicle.

As in the case of all the Daimler machines, the frame is built up with hard wood between two steel flitch plates, both side and cross members being on the same principle. Steel wheels are used, and these are now of the same size on both the front and back axles, a matter of some importance to the operator. A number of minor improvements have been incorporated in the latest designs from the Daimler works, all of which make for higher efficiency and at the same time tend to so simplify the mechanism of the chassis as to render it as near fool-proof as possible.

Accessibility is also a strong feature in the design, so that repairs and replacements when necessary can be readily carried out with a minimum of labour. In our issue of January 15, an illustrated description was given of a very ingenious method of lubrication which has been designed for lubricating the spring pins and shackle bolts on the 5-ton model, and it is worthy of note that throughout the design of the chassis the same care has been taken to perfect details and so enhance the high reputation which Daimler vehicles have established in all parts of the world.

STRAKER-SQUIRE (1913) LIMITED.

At the first statutory meeting of Straker-Squire (1913) Limited, held on January 15, at Spencer House, South Place, E.C., Mr. Sydney Straker, Assoc.M.Inst.C.E., presided in the unavoidable absence of Mr. Squire. The secretary (Mr. J. W. Beeby) having read the notice convening the meeting, the chairman said that the company, since incorporation, was continuing to hold the premier position which it had already secured in the business, especially in regard to heavy vehicles. The sales of light cars had also been exceedingly good, and, in fact, the increased sales in all departments represented approximately 30 per cent. as compared with the corresponding period of the previous year. Their foreign operations were also being very considerably extended. With regard to the heavy vehicle department, they had during the last few weeks secured very substantial orders. They included Maple and Company and Carter, Paterson, and Company—household names to them all. They received the previous week an order for two 4-ton pantechnicons from Maple and Company, which was the third repeat order from that firm, and they hoped Messrs. Maple would adopt the Straker-Squire model in future, and increase their fleet by the use of that car exclusively. Carter, Paterson, and Company on the previous day sent in an order for six of their depot vans to carry 3-ton loads. That was the fourth repeat order from Carter, Paterson, and Company. Orders had been received during the last few weeks from Southend Corporation for a fleet of omnibuses; also from Liverpool Corporation and from the leading company in Cambridge for six more cars. Straker-Squire vehicles formed a large fleet in Cambridge. In Peterborough also they had had a repeat order, the second repeat order from the municipality. They had also received orders within the last few weeks for 18 cars to go to Scotland. They had also been very busy in Dublin, where, he supposed, the Straker-Squire car was more generally used than any other make. Messrs. Jacobs, the biscuit company, had adopted the Straker-Squire model, as had also Messrs. Heiton, the coal people. Then they recently supplied to the Allen Motor Omnibus Company, of London, Straker-Squire cars, and they had sent a repeat order for three cars. It was possible that the directors might see their way clear to declare an interim dividend. That was a purely formal meeting held to comply with the Companies Act, but he would be pleased to answer any questions. There was no response, and the meeting then terminated.

DISAPPEARING HORSE TRAMCARS & OMNIBUSES.

Only three horse omnibuses are now running in the London fleet of Thomas Tilling, Limited. Six were taken off the Penge-Beckenham service in January. Sir Lawence Gomme, in the annual report of the London County Council to March 31 last, mentions that in 1903 the horse-drawn cars numbered 517. Last year there were only 74 running, and that number is reaching extinction. Electric cars, introduced in 1904, when 306 were running, had increased to 1,676. In the same 10 years the number of passengers increased from 109 millions to 512 millions, and the revenue from £444,000 to 2¼ millions sterling. The report mentions that the omnibus was first used in London in 1829, when it was introduced from Paris. The fare from Marylebone Road to the Bank was a shilling. Now the same distance can be covered in less than half the time for twopence. In 1833 two steam vehicles were introduced, and ran regularly for a time between Paddington and the Bank, and along the Stratford and Islington Roads.

MOTOR FIRE ENGINES FOR PRESTON.—Preston Town Council have agreed to seek sanction from the Local Government Board to borrow £3,360 for the purchase of two motor fire engines, one motor cycle fire engine, and one motor ambulance carriage.

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MOTOR TRAFFIC.

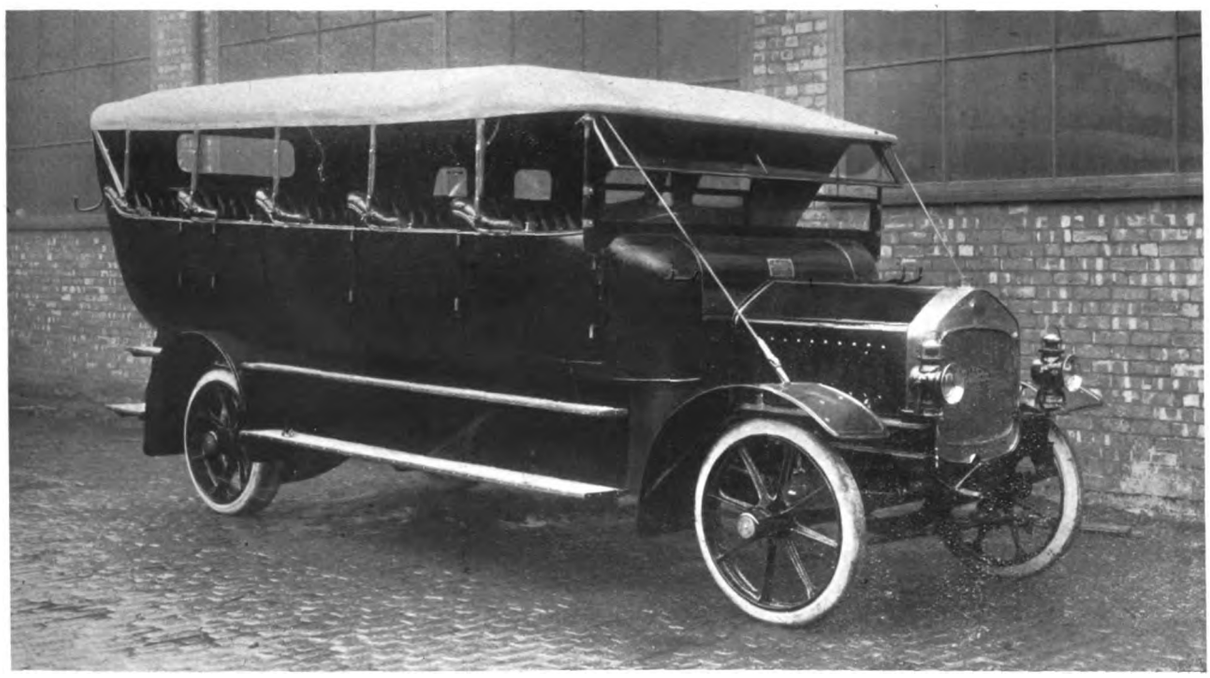
NORTHERN COMMERCIAL MOTOR SHOW.

From whatever point of view it was regarded, there has never been a more successful exhibition of public passenger, commercial, and industrial motor vehicles held outside of London than the annual show which took place in the City Hall, Manchester, from January 30 to February 7. The building in which the exhibits were arranged was admirably adapted for the display. In size it is nearly as extensive as the Royal Agricultural Hall of the metropolis, and while it is conveniently situated, it is surrounded by thoroughfares in which there is not a great amount of traffic. Thanks to this circumstance, a number of the exhibitors were able to have in attendance outside the hall some half a dozen vehicles for demonstration purposes, while other makers were afforded similar facilities by arrangement with local users of their machines, or at their North of England branch situated in Manchester. Lancashire can claim the distinction of being the birthplace of the commercial motor vehicle, and no better indication of the growth of the industry can be desired than the number of manufacturers who possess local offices in the cotton city. There were 36 exhibitors of vehicles, about half a dozen being makers of, or agents for steam types. All but one of the remainder each staged two, three, or four machines of the petrol class. The one firm which has made such a striking success of their petrol-electric system was also represented. Twenty-three exhibitors of tires and other accessories occupied stands in the gallery on the four sides of the hall, the stalls of several of the tire makers being remarkable for unique design.

Visitors were very numerous, and they were evidently all of the class who were either bent on placing orders, or who contemplate adopting motor traction. Municipal deputations were conspicuous, and in some cases they were accompanied by the tramway manager of their municipality. Several of the latter were present on their own account, making a close scrutiny of various chassis, with the object of recommending one for use in carrying out auxiliary traffic schemes. On Manchester 'Change day the members of the City Tramways Committee looked in during the afternoon on their return, in one of their motor omnibuses, from making an inspection of proposed suburban routes to be worked by that form of vehicle. For that purpose the Corporation are applying for powers during the coming session to enable omnibuses to be run in the city and in the districts of other authorities where their tramways extend.

Most prominent among the exhibits were the chars-a-bancs, which are now provided with such effective hoods that they can be run with profit during the winter. Makers are also offering an inducement to furniture removers to become owners of these machines. This is done by rendering the chassis capable of being fitted with either lorry or char-a-bancs bodies, so that private week-end football and other traffic can be catered for. These conveyances carry from 16 to 30 passengers. It is worthy of notice that at Blackpool 28 owners have this year made applications for licences for 54 vehicles. Lorries and vans were, of course, most numerously filled classes, and the excellence of the exhibits must have made the task of the would-be user a most difficult one. Appended will be found descriptions of the stands.

Albion Motor Car Company, Limited.—To the owner of public service vehicles who has to study local objections to the largest type of chars-a-bancs, the 24-seat exhibit shown here proved a great attraction. This new model, which has a wheel base of 13 ft. 6 in., is of 25 H.P., with a 2-ton chassis. The latter was illustrated and described in this journal of August 14 last. The torpedo type body is very roomy, the leading row of the five rows of seats having a curved steel dashboard. There are doors at the end of each seat. The



Albion 24-Seat Torpedo Char-a-Bancs.

upholstery is in green hide, and the body is painted dark brown. The price is £805, which includes a patent quick-acting hood that can be manipulated by the driver from the front of the vehicle. It is termed the "Klosequick," and it can be raised or lowered in a few seconds, a vast improvement likely to be appreciated by passengers. Of the engine fitted by this Glasgow firm it may be repeated that it has four cylinders, and that it is governed on the inlet by the Murray patent governor, fitted to the front end of the crank shaft. This effectually prevents the engine speed exceeding 1,050 revolutions, even when the engine is running light. The maximum speed is 20 miles per hour. An Albion mileage recorder is fitted. A small gear-driven pump supplies oil under pressure to all parts inside the crank case, and the valve gear is lubricated by splash. The valve stems are totally enclosed by detachable covers. An Albion patent automatic carburettor ensures maximum economy and efficiency, and the company's paraffin carburettor can also be supplied. A high-tension magneto, driven through Albion flexible coupling provides the ignition. The magneto timing is variable, and a hand ignition advance is also available. Cooling is by the Albion patent combined pump and fan, mounted at the front end of cylinder casting. Three speeds forward and a reverse speed are provided, the top speed being a direct drive, the operation being controlled by a single lever. The worm drive is carried in specially strong casings, and the driving chains are completely encased. A separate exhibit was formed by a 32-H.P. Albion engine, which is used on the company's heavy commercial

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vehicles, and on large chars-a-bancs. Lack of space debarred the company from showing a complete vehicle of the higher horse-power. The engine has three-point suspension, thus preventing it taking the shock at all points. For use in tropical climates the Albion patent

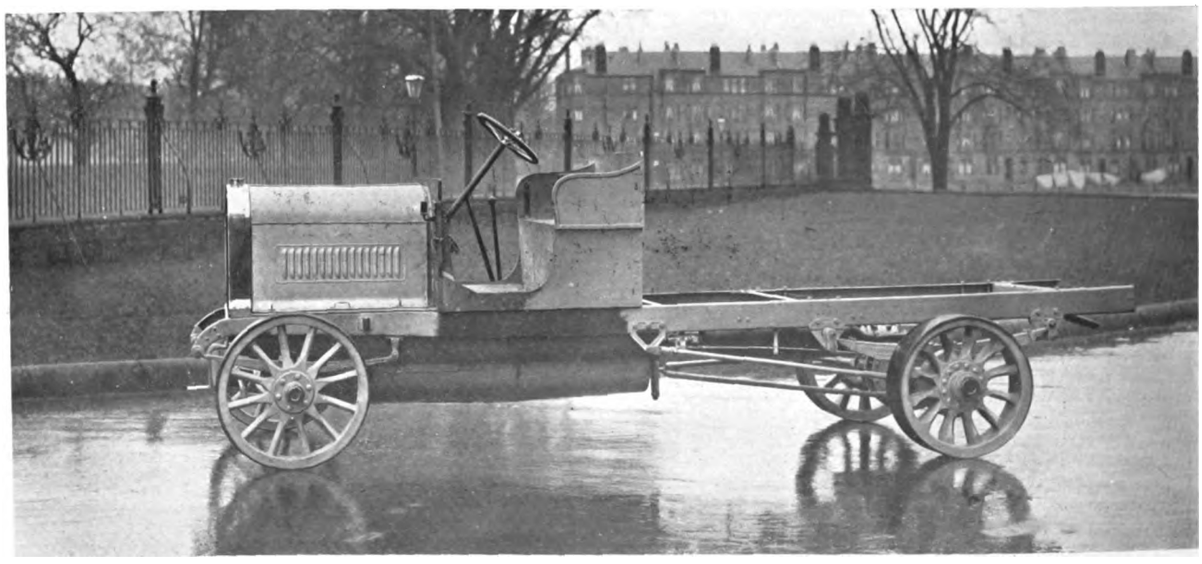
15-h.p. 15-cwt. Albion Box Van.

Albion Delivery Van after Covering 100,000 Miles.

paraffin carburettor can be fitted. The stand was completed by a very neat 15-H.P. 15-cwt. box van at £453

Argylls, Limited.—The 15-H.P. 1-ton lorry shown at this Scottish stand doubtless attracted attention from those engaged in the staple trade of Lancashire. It has a 4-cylinder engine, a carburettor of the Zenith type, lubrication by a direct-driven gear pump, three forward speeds and reverse in a gear box adapted for hard usage, and worm drive. The wheel base is 11 ft., and the wheel tracks 5 ft. A 20-H.P. 2-ton chassis, also for commercial use, was exhibited, its design being on similar lines, but the worm and worm wheel run on extra heavy ball bearings. The 15-H.P. chassis can also be had fitted with 4-passenger taxi-cab body.

away from the roads in the conveyance of baggage and daily supplies. The 5-ton machine has a wheel base of 13 ft. 6 in., and the length over all is 20 ft. 5 in. As the result of the constant search for improvement made at the works at West Kensington, the 5-ton chassis has been rendered particularly suitable for the heavy conditions of Lancashire working, and the company have now a depot and garage at Manchester. The power of the engine has been increased, the frame strengthened, and the hand brake altered on the internal expanding principle, acting directly upon the road wheels. There are three brakes, the foot brake playing upon a drum in front of the differential. The cardan shaft has been strengthened, and the Claudel-Hobson carburettor has been fitted. It is suitable for heavy or light spirit, and gives an average of 8½ miles per gallon with a 6-ton load at 20 miles per hour. A galvanised steel petrol tank in place of a copper one enables benzol to be used. For lubrication there is an automatic tell-tale arrangement. Four speeds forward, one reverse,



Argyll Chassis.

British Berna Motor Lorries, Limited.—Here the exhibit comprised a 35-40-H.P. 5-ton British Berna chassis suitable for commercial work, and a 35-40-H.P. 5-ton chassis fitted with a brewer's dray body. One good testimonial to the Berna 5-ton lorry is its use by Colonel Sir Thomas Kearn's Army Service Corps Company of the 1st City of London Division of the Territorial Force in the rough work accomplished during the fortnight's annual training. On these occasions broken and hilly ground is traversed with direct drive on top speed, are given by the change-speed gear. The engine has four cylinders, cast separately, the inlet and exhaust valves being operated by one shaft. Ignition is by the latest Bosch high-tension enclosed type of magneto. Transmission is by cardan shaft from gear box to differential, the whole gearing being encased and running in oil. The differential is suspended from the main frame upon ball bearings. Engine and gear box are carried upon an under frame, upon the cantilever principle, extending well towards the rear

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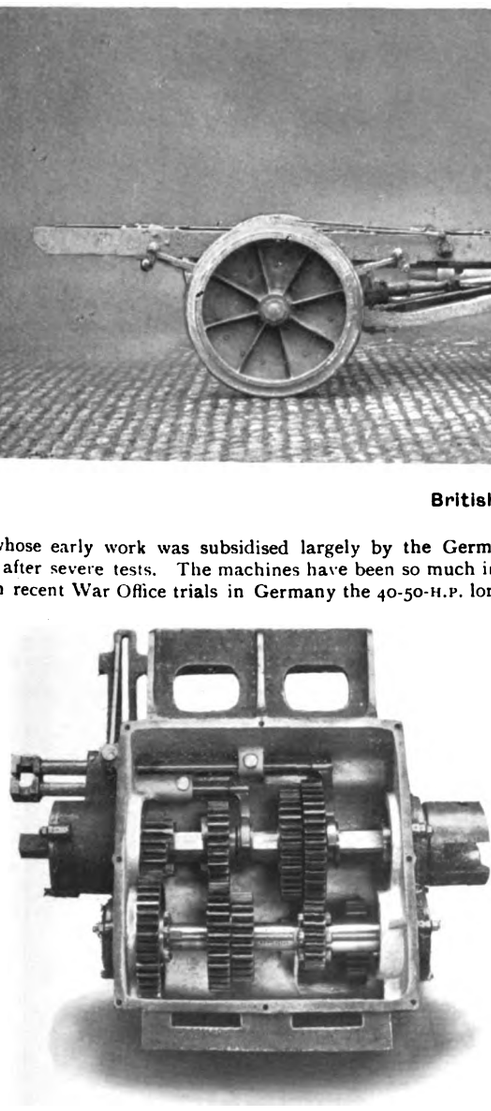
axle. It is due to the use of ball bearings throughout (engine excepted) that such a good mileage is given per gallon.

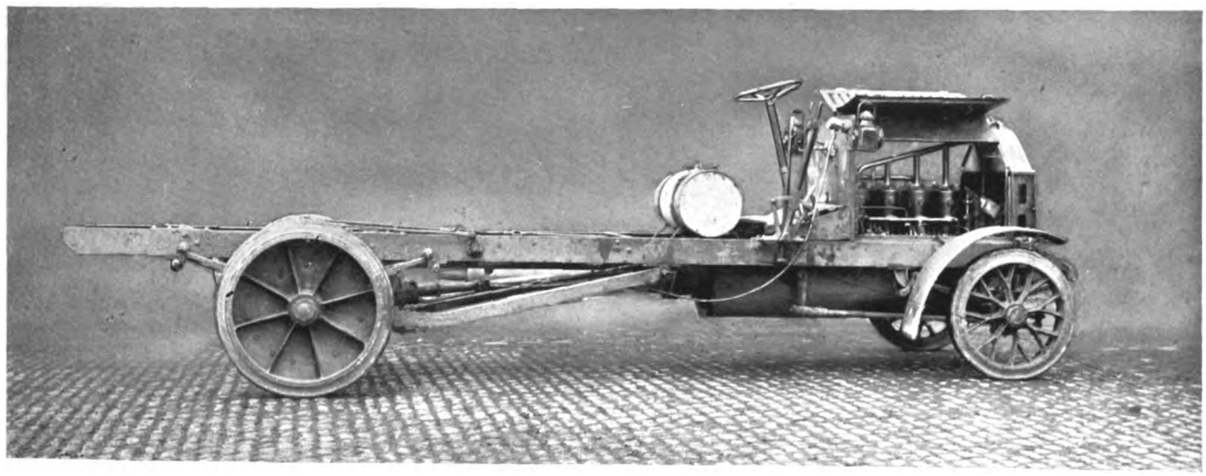
Stoewer (London), Limited, and Stoewer (Northern), Limited.—The local agents staged one of the most attractive exhibits to be found in the exhibition. It was a 10-16-H.P. 10-cwt. Stoewer car with patent interchangeable half-bodies, giving three varieties of service, namely, a box van, a lorry, and a private car. The combination has been patented by R. H. Hopkinson, of Bradford, and it is stated that the first car incorporating the device has run two years already without requiring repairs, while the bodies are just as good and rigid as when first used. The appliance does not materially affect the price of the car, and it is stated that the small difference can be easily saved in the course of a few weeks by the extra usefulness of the interchangeable half-bodies. Another machine at this stand was a 35-H.P. 3 to 4-ton Stoewer chassis, listed at £650 with tires. This is representative of the company's range of lorry and commercial chassis, which from 3 to 6 tons are designed to draw a 2-ton trailer. These 4-cylinder and 4-speed types were described and illustrated in our issue dated March 13, 1913, but as now made they have cardan shaft drive in place of the chain. Stoewer vehicles are the product of a German firm whose early work was subsidised largely by the German War Office after severe tests. The machines have been so much improved that in recent War Office trials in Germany the 40-50-H.P. lorry, fully loaded, went through what is described as the greatest test which has ever been held in any country, traversing mountainous roads 60 miles each day for one month, without an involuntary stop or a hitch of any description.



Berna Gear Box.

The Wolseley machines were exhibited by J. Blake and Company, the company's agents for the district. The collection consisted of four models, and included the 3-ton subsidy machine, which embraces a number of interesting constructional features. Other exhibits were a 1-ton station omnibus for the Great Northern Railway Company; 30-cwt. chassis fitted with flat platform wagon body; and a 12-cwt. box van.

Berna Differential Gearing.



British Berna 5-Ton Chassis.

The Austin Motor Company, Limited, exhibited an exceptionally fine specimen of their motor ambulance, which attracted considerable attention from the representatives of the various municipal authorities who visited the show. They also staged a specimen of their new 3-ton model, which was fully described in our issue of May 8, 1913.

The Berliet machines were represented by five specimens of this well-known French built car. They were shown on the stand of Mr. William Arnold, of Upper Brook Street, Manchester who is the sole agent for Berliet commercial vehicles in this country. These included a 12-H.P. 15-cwt. delivery van chassis, 15-H.P. 1-ton delivery van, and 25-H.P. 2-ton omnibus chassis, each with live axles; and two chain-driven models, a 2½-ton open lorry and the 3-4-ton French subsidy chassis fitted with an automatic governor, by means of which a predetermined speed cannot be exceeded.

Siddeley-Deasy Motor Car Company, Limited.—The speciality of this firm is the "Stoneleigh" type of chassis suitable for carrying loads of 35 cwts. Two specimens were staged, one being a bare chassis and the other a complete machine fitted with a brewer's lorry body. The engine is a 22-24-H.P. silent Knight sleeve valve unit, 90 by 130 mm. There is a single plate clutch, and the transmission is by cardan shaft to a worm driven live axle.

The Star Engineering Company, of Wolverhampton, staged a 15-H.P. 2-ton chassis which embraced a number of interesting constructional details, the outstanding feature of which was the simplicity of design coupled with perfect alignment. The 4-cylinder engine and the gear box are mounted upon a sub-frame, the final drive being by double reduction type of spur and bevel gearing.

The Yorkshire Commercial Motor Company.—This firm exhibited a single example of its well-known steam wagons; this was fitted with a flat platform lorry body to carry loads up to six tons,

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This machine has 3-speed gear, the differential being entirely enclosed. Steel-tired wheels are fitted, with internal expanding brakes.

Belsize Motors, Limited.—This local firm from Clayton had secured a stand accommodating five exhibits. Two of these represented vehicles so well-known as the 12-H.P. 4-passenger cab at £365, and the 11·9-H.P. 5-cwt. box van in newspaper transport, a leading user of the latter in London being the *Evening News*. Another small machine was the 15·9-H.P. standard box van. Most interesting of the exhibits were those showing two uses for the 32·4-H.P. 3-ton chassis. One was a 25-seat char-a-bancs, with wind screen and Cape cart hood, at £775, the other being a Belsize lorry, with canopy over the driver, at £650.

Belsize 3-Ton Van.

The chassis alone is listed at £575. Less expensive chassis and bodies are also made to carry 15 and 20 passengers. The Belsize chassis has a 4-cylinder vertical motor, with a normal speed of 1,000 revolutions per minute. All the valves are on one side, and their seatings are surrounded by water. Lubrication is by pressure by oil pump at the bottom of the crank case, and the water cooling is by centrifugal pump. The clutch is the Hele-Shaw multiple disc. Transmission is by cardan shaft to worm-driven back axle, or chain drive, at option The worm drive is strongly encased in steel, provided with ball bearings, and thrust bearings where necessary. Speeds are four forward and reverse, all changed by one lever. The wheel base is 13 ft., and the track 5 ft. 3 in.

Daimler Company, Limited.—Two novelties at the stand of the well-known Daimler Works, Coventry, were a 22-H.P. 2-ton chassis, listed at £550, and a 40-H.P. 5-ton lorry. They are described and illustrated elsewhere in this issue. The 2-ton chassis embodies the results of experience with the Daimler omnibus and heavy lorry chassis, notably in the inclusion of the Knight-Daimler sleeve-valve engine. The other new model is a 40-H.P. 4-ton lorry, at £810. It has high sides, and is one of eight ordered by the Lancashire and Yorkshire Railway Company. The stand was completed with a 3-ton chassis, fitted with a luxurious char-a-bancs body. The silent Daimler 4-cylinder engine develops 40 H.P. at 1,000 revolutions per minute, and it has a 3-speed silent-chain gear box, and Daimler-Lanchester worm-driven axle. The constructional features of this machine are similar to those of the 3-ton Daimlers successfully operated by the London General Omnibus Company. The chassis price is £600, and for the complete char-a-bancs £1,007, which sum includes a dynamo for electric lighting.

Halley's Industrial Motors, Limited.—A feature of the two exhibits here is the simplicity of design of the engine and the various parts In the 25-H.P. 2-ton lorry the water is circulated by natural circulation. A 35-H.P. 28-seat torpedo char-a-bancs is noticeable for the extremely accessible water pumps and magneto. The first-mentioned model has been used as a demonstration vehicle for a considerable time, and it was shown with the gear box opened out, the gear wheels giving no sign of wear. The char-a-bancs is suitable for 3-ton loads, and it is convertible to a lorry, a practice largely followed by owners who engage in pleasure traffic and furniture removal. Other features of the Halley vehicles are that movable parts are easily renewable, and that ample lubrication is provided. There are many Corporations among the Halley patrons, and a large percentage of the business is due to repeat orders.

Leyland Motors, Limited.—These notable Lancashire makers showed four vehicles from the works at Preston. A War Office subsidy 30-H.P. 2½-ton model is for aviation use in the Army, and the chassis is similar to the 55 lorries which the company have supplied to the Army Council. A 60-H.P. fire engine ordered by Wallasey Corporation formed a striking exhibit. It has a 450-gallon turbine pump, and carries first-aid and other accessories. Leyland fire-fighting appliances are to be seen in many towns, and as the result of their success in the London Fire Brigade an order has been received for 12 more fire engines and 11 tenders. General attention was attracted by the 55-H.P. 4-ton char-a-bancs seating 27 persons, the torpedo type body being very roomy. It is fitted with Cape hood and wind screen, speedometer, etc. The price complete is £1,130, and the chassis can be fitted with either goods or passenger body. In view of the long journeys now made in these vehicles it is important to add that the Leyland Company fit the reliable electric lighting set made by C. A. Vandervell and Company, of Acton, London, whose sets illuminate a number of the London General omnibuses. A reminder that the reputation of the Leyland Company has been gained for steam as well as petrol traction was given by a 35-H.P. 6-ton standard steam wagon, listed at £560. It has a vertical type boiler with poppet valves. In view of the complaints of mud splashing arising from motors it is of interest to mention that the char-a-bancs already referred to is fitted with an effective splash preventer, which cannot be damaged by contact with the kerb. Among the many new orders received since January, the last was one for 55 passenger vehicles for the British Electrical Federation, who are running services in various parts of the country.

Dennis Brothers, Limited, exhibited three models, a 35-H.P. char-a-bancs constructed to seat 24 passengers, and fitted with C.A.V. electric dynamo and lamps; a 40-H.P. 5-ton chassis fitted with detachable lorry body, interchangeable with char-a-bancs body; and a 400-gallon Gwynne turbine fire pump fitted with a 60-H.P. engine. The latter was fully equipped with first-aid ladders, and the usual extinguishers and suction hose.

Foden's, Limited, showed one of each of their two standard models. The 3-ton machine being fitted with Polack solid rubber tyres.

Richard Garrett and Sons, Limited Two very fine specimens of the Garrett patent superheated steam wagons were shown on this stand, a 25-30-H.P. 3-ton machine fitted with platform lorry body, and a 30-35-H.P. 5-ton wagon fitted with a special tipping body constructed to the order of H. Lees and Son, Limited, of Park Bridge Ironworks, Ashton-under-Lyne. The hand screw tipping arrangements enable the platform to be raised so as to form a continuous sloping platform, the top being well clear of the chimney. By this means long sections of shafting—in which Messrs. Lees specialise—can be carried with facility. Both machines were fitted with cast-steel wheels with solid rubber tyres.

Commercial Cars, Limited.—Three exhibits were staged by the Manchester depot. A 40-H.P. Commer car, fitted with a No. 1 Kerry

2-Ton Commer Car.

type 30-seat torpedo char-a-bancs body, had the doors opening on one side only for passengers, and on both sides to the driver's seat A large Cape cart hood and wind screen are fitted. The engine has adjustable tappets. The vehicle is the sixth repeat order from a local firm A 32-H.P. 3½-ton R.C. type Commer car is fitted with a flat platform, 3 in. sides, and boxed-in canopy. High side doors give access to the driver's seat, and there is a glass wind screen. The driving chains are enclosed in oil-tight cases. This was a fifth repeat order. A 2-ton lorry for the British Oxygen Company also had a canopy and screen for the driver's seat.

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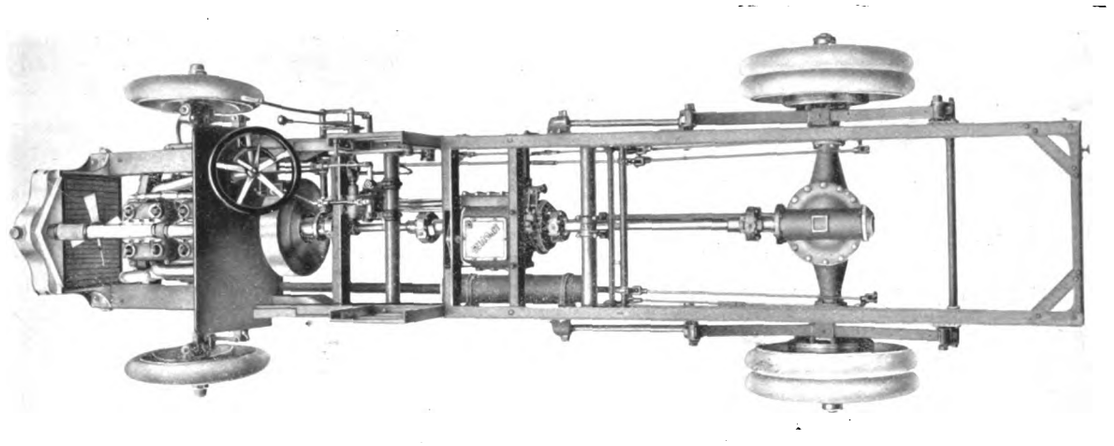
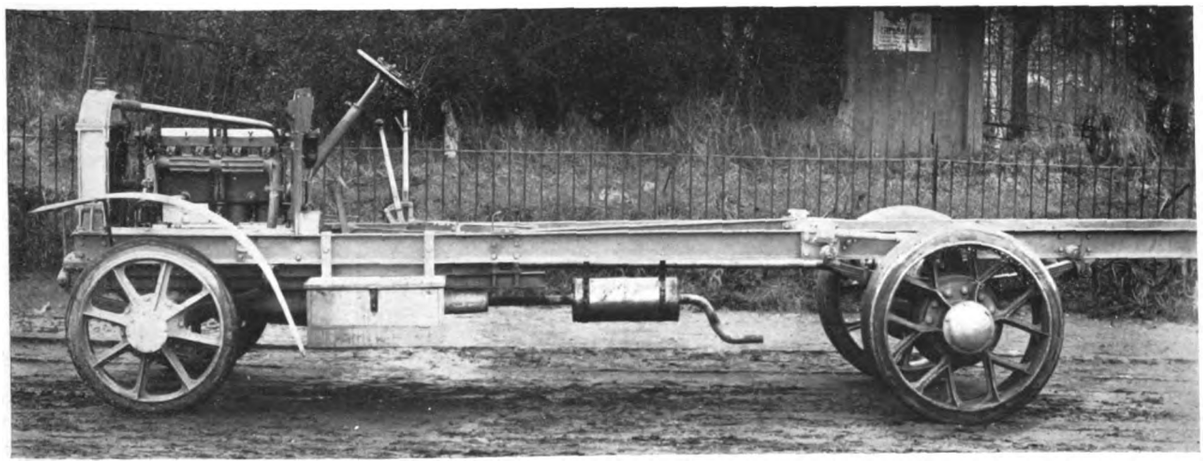
McCurd's Lorry Manufacturing Company, Limited.—An indication of the demand which has arisen for the 4-cylinder 3½ and 5-ton vehicles designed by this company, of Store Street, London, W.C., is to be found in the new works which are nearing completion at Willesden. The 3½-ton chassis exhibited attracted many inquiries. Its price is £575, plus tires, and some of its details were described in the issue of this journal dated August 14, 1913. Besides the complete chassis, the various parts were shown separately. The machine incorporates



Plan View of McCurd Chassis.

all the approved features that give ease of assembly and extreme accessibility. For instance, the rear axle can be dismantled in less than 40 minutes, and all the revolving parts of the axle can be withdrawn without jacking up or disturbing the road wheels. The differential gear is of the spur-wheel type, and the worm housing is of unique design, as the load and thrust ball races are placed in position and adjusted before sliding the worm shaft into position, so that the whole can be withdrawn by simply removing the bolts from the end plate which locates this. By the McCurd patent system of lubrication the oil consumption is reduced to a minimum while ensuring perfect lubrication. The rake of the steering pillar is adjustable by simply undoing two bolts. This arrangement enables any type of body to be fitted. There are two independent brakes on the back wheels, and a separate brake on the counter shaft. The company had outside the hall two demonstration vehicles, one being the original machine. The numerous inquirers were informed that delivery can be given in a fortnight.

Maudslay Motor Company, Limited.—Four exhibits staged by Messrs. Leach and Seed, the local agents of this Coventry Company, comprised 40-H.P. 3-ton chassis, 30-H.P. 3-ton chassis, 40-H.P. 4-ton chassis, and 40-H.P. 3-ton char-a-bancs, with torpedo type "De Luxe" body, hood, side curtains, wind screen, speedometer, etc. The price of the char-a-bancs is £850. The 3-ton chassis is extensively used for single and double-deck omnibuses, the 4-ton chassis also being utilised for double-deck bodies. With tires the 3-ton is listed at £628, and the 4-ton at £695. Simplicity, strength, and unique accessibility are the features achieved in each model. Thus the engine valves are all overhead, and open direct into the head of the cylinders. They are all interchangeable, and by swinging back the cam shaft case can be readily reached. A ball joint in the vertical shaft obviates interference with the timing by the movement of the case. Large inspection doors on both sides of the crank case enable a single piston to be removed, cleaned, and replaced within half an hour, while the whole set can be so treated in a forenoon. There is forced lubrication, and the simple design of carburettor gives maximum power and exceptionally rapid acceleration. With it can be used a mixture one part paraffin and two parts petrol, giving, it is claimed, practically the same mileage as with ordinary petrol. The Bosch dual ignition provides a coil and accumulator for starting purposes as well as magneto. The gear box gives four speeds forward and reverse, and the accuracy with which the case-hardened steel has been cut is principally responsible for the comparative silence of the vehicles. The back axle is of the live type with worm drive. The Maudslay axle carries the whole load of the vehicle, yet the axle is unequalled for accessibility. The whole of the differential gear can be lifted right away from the axle without jacking up. Respecting the 4-ton model, mention may be made that the wheel base of 15 ft. 6 in. is 3 ft. longer than the standard type, the idea being to cope with the cotton-carrying business in bulk. Three-quarters of the load is now thrown forward of the back axle, thus complying with the new regulation regarding rear-axle weight. The char-a-bancs is built specially low, having only one step, and was by 4 in. the lowest built model in the Exhibition. It was designed



Maudslay 5-Ton Chassis.

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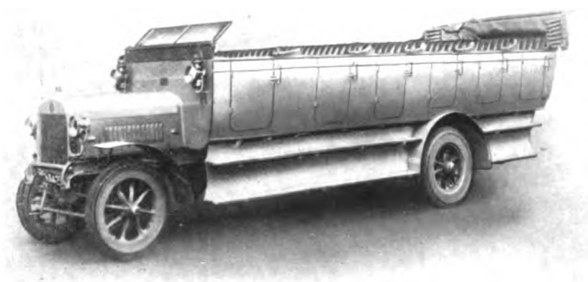
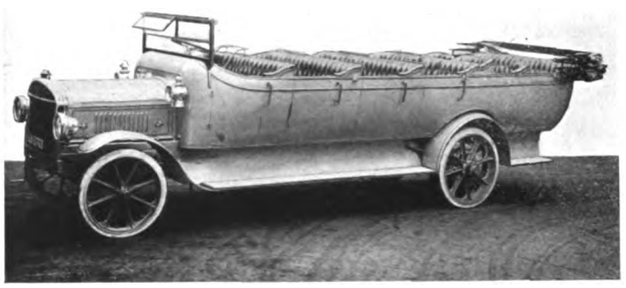
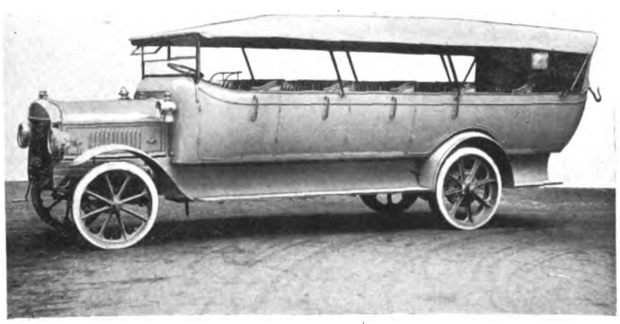
MOTOR TRAFFIC.

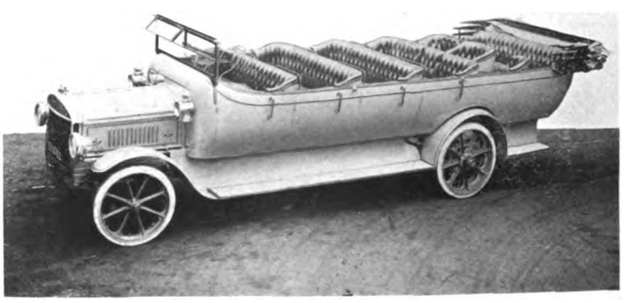
to comply with the Blackpool regulations, and repeat orders have been received. With the Zenith carburettor fitted to the 4-ton chassis, 8½ miles are given to the gallon. This is accounted for by the efficiency of the transmission generally, and by the fitting of ball bearings, which render the vehicle so free in its movements that it can be moved by the pressure of one hand.

W. A. Stevens, Limited, 26, Victoria Street, London.—Two of the three exhibits from their Maidstone works represented, as far as the chassis were concerned, the types of petrol-electric vehicles which have had world-wide trial. In this country Stevens-Tilling omnibuses are in use in a dozen or more towns, following the trial given them in London service by Thomas Tilling, Limited: and Birmingham and









Tilling-Stevens Petrol-Electric 40-h.p. Char-a-Bancs.

district by the Midland Omnibus Company. Another severe test was the adoption of this system by Thomas Tilling, Limited, for carrying the mails on long-distance routes. Nine or more tramway authorities in England and Scotland have adopted Messrs. Stevens' petrol-electric vehicles, and seven municipalities and tramway companies are using them abroad. The merit of this invention is the elimination of the clutch and gear box, and the substitution of a flexible electrical transmission between the engine and the driving wheels. The final drive is effected by an electric motor driving by means of a cardan shaft the worm gear on the back axle. Thus the vehicle is easy to start and to control, while the running is smooth, silent, speedy, and economical. The electrical supply for the motor, instead of being provided by a battery, is generated by a specially constructed dynamo, direct coupled to the petrol engine, giving extreme flexibility and silence, and great powers of acceleration. It is claimed that the cost of the upkeep of petrol-electric vehicles is less than any other self-propelled vehicle of the same size. Running in London, these omnibuses had traversed 6,100,785 miles to December 31, 1913, the first six vehicles to be introduced having done 568,782 miles, or an average of 94,797 each. The Birmingham and Midland Omnibus Company have had 50 vehicles in use, which have registered 1,500,000, and the company have placed an order for 40 additional omnibuses. A noteworthy exhibit was a 40-H.P. 4-ton char-a-bancs, 14 ft. 6 in. wheel base, seating 28 persons. A feature of this is that access can be gained to the back of the car from the fourth row of seats. The price is £935. Another exhibit was the above vehicle's bare chassis at £730, which is similar to those for which the Birmingham repeat order has been given. There was also shown a 20-H.P. 2-ton gear-driven chassis, with gear box transmission, and 13 ft. wheel base, at £495. This was introduced last year, and was described in this journal on December 11. It is suitable for single-deck omnibuses and commercial vehicles.

Mann and Overtons, Limited, had three specimens of their well-known Unic chassis on view; these consisted of a 10-12-H.P. light delivery van, a 12-16-H.P. standard taxi-cab, and a 16-24-H.P. char-a-bancs, constructed to carry 16 passengers, fitted with Continental pneumatic tires, twin on the back wheels.

Walker Brothers, of Wigan.—The Pagefield 40-H.P. char-a-bancs was shown on Messrs. Walker Brothers' stand. It has a torpedo-streamline body, built for Messrs. Middleton and Woods. The motor conforms largely to the makers' War Office subsidy design, the front of the frame being dropped. Another exhibit was the 28-H.P. 2-ton Pagefield lorry built for carrying timber, with specially long platform body. This has been specially constructed for Mr. J. Elvey, timber merchant, of Seaham Harbour. The remaining exhibit was a 3-ton chassis of about 32-H.P., which is to be despatched to Australia On the lorry platform were some examples of Butler axles, with road wheels and springs as usually fitted to the Pagefield 2-ton vehicles. The springs used are strongly constructed to stand rough usage under heavy weights The Pagefield vehicles are good types of Lancashire manufacture, of excellent design and workmanship.

F.I.A.T. commercial vehicles were staged by Jas. W. Haworth, the Manchester agent, no less than five models being on view; these ranged from a 10-cwt. delivery van to a 3-ton lorry chassis, a notable exhibit being a 16-seater char-a-bancs, mounted on a 2-ton chassis and fitted with pneumatic tires.

J. and E. Hall, Limited, were represented by Max. R. Lawrence, of Blackfriars, Street, Manchester, their agent for the district. Two 4-ton models were exhibited, one being a bare chassis, and the other a brewer's lorry of the high-sided type, constructed to the order of the Birkenhead Brewery Company, and the fourth vehicle supplied to that firm.

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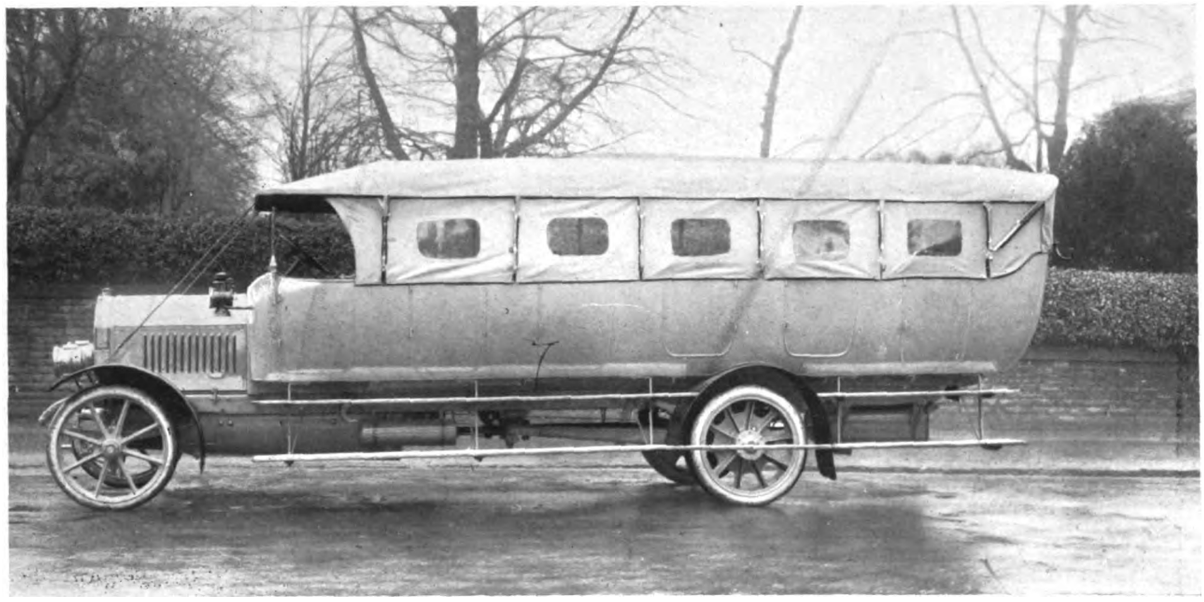
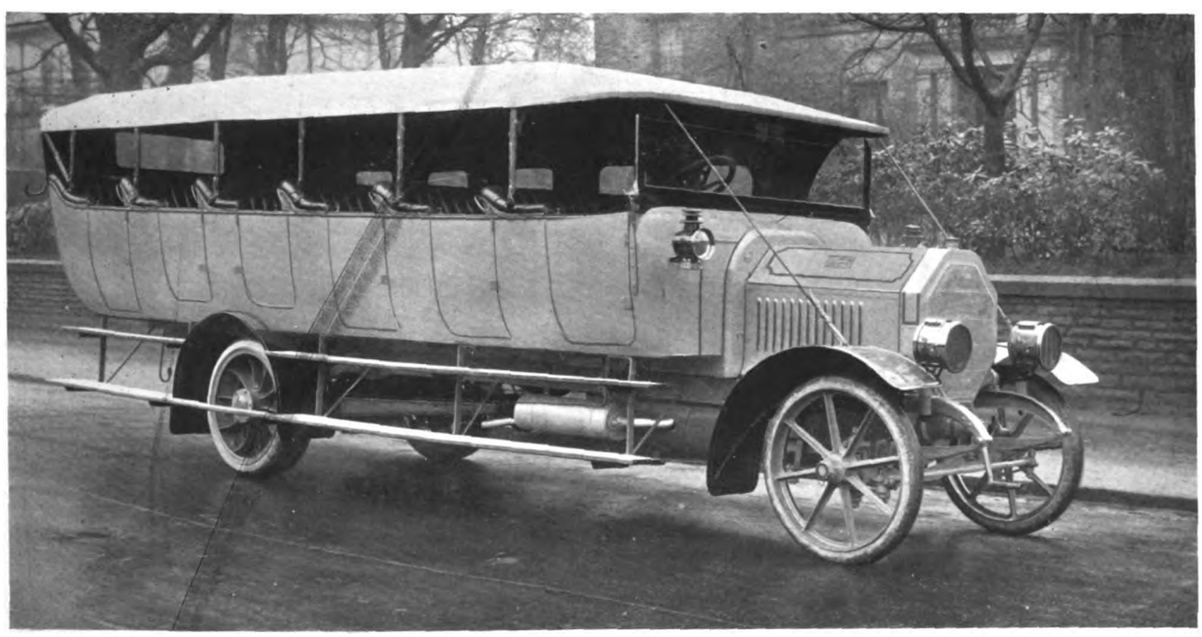
MOTOR TRAFFIC.

Milnes-Daimler-Mercedes, Limited.—The exhibits of this company were shown on the stand of Crawfords, Limited, their district representatives, who also had several demonstration vehicles available in the city. The 35-H.P. 5-ton chassis has a 4-cylinder engine cast in pairs, and is designed on the same lines as the engines of all this company's commercial models, of which over 1,500 are in use in this country. All parts are easily accessible, and the chassis generally is notable for the use of pressed steel at points where extra strength is required. On all types, excepting the 15-20 H.P., the valves, magneto, pump, and carburettor are all situated on the same side, thus allowing the other side to be free of all gears. The timing gears are totally enclosed, and are situated between the two cylinder pairs, this arrangement permitting a bearing on each side of the timing wheels, both on the crank shaft and on the cam shaft, ensuring a silent drive. Both the inlet and the exhaust valves are situated in the cylinder heads. This design gives the maximum power for a fixed diameter of piston, as it dispenses with a pocket for the inlet valve; these valves are fitted with adjustable tappets. The carburettor, of the company's own make, gives economical results, and it is fitted with both hot and cold air supply. An enclosed governor acting on the throttle of the engine reduces petrol consumption. Ignition is by high-tension magneto, situated in a very accessible position, and lubrication is by forced feed. There are four speeds and reverse, with gate change, giving a maximum of 10 miles per hour, and as only short shafts are used there is no whipping. The price of the chassis with tires is £760. The foregoing details as to construction are also applicable to the chassis of the 35-H.P. 30-seat char-a-bancs which was exhibited, but there are one or two differences. The wheel base, for instance, is longer than the 14 ft. of the 5-ton model. The fixed drive, too, is by a bevel-driven live rear axle in place of the cardan shaft and gear rings in the rear wheels.



Side Screens of Milnes-Daimler Char-a-Bancs.



Milnes-Daimler 3-Ton 30-Seat Char-a-Bancs.

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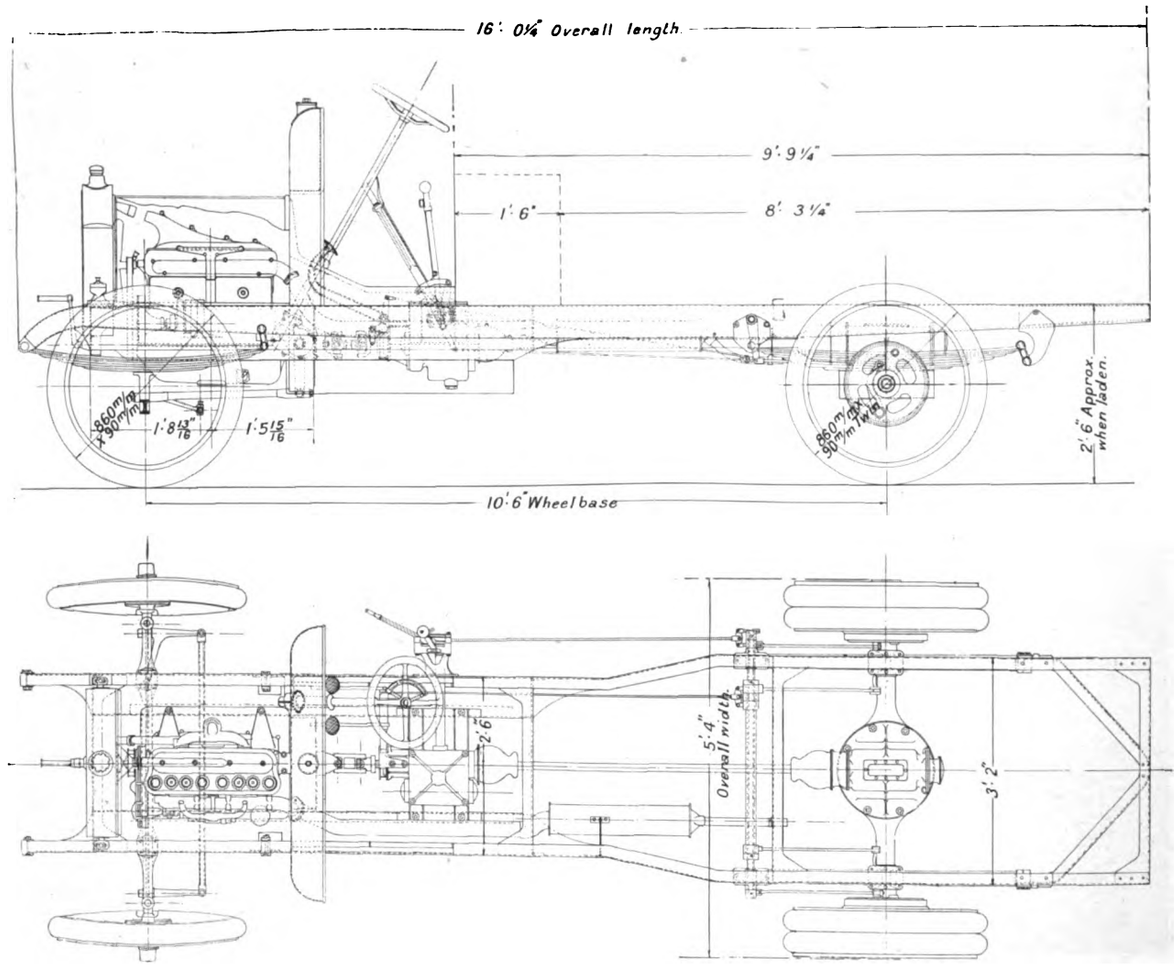
MOTOR TRAFFIC.

Straker-Squire (1913), Limited.—No manufacturers could desire a better tribute to the worth of these vehicles than is contained in the descriptive and illustrated 48-page catalogue which is issued by this company from Nelson Square, London, E.C. The illustrations show their vehicles in public and private use in a number of countries; there are a large number of testimonials published, and working costs are given of a number of vans and lorries. It is of interest to note that the company have supplied 860 public service vehicles, and about 1,600 lorries and vans. The first-mentioned description have been constructed for, among other customers, the London General Omnibus Company, the London Road Car Company, the Great Western Railway Company, British Automobile Traction Company, Brighton Omnibus Company, the Allen Omnibus Company, and Gateshead Tramways Company. Outside the hall the company had three demonstration vehicles in attendance. One was a 40-H.P. double-deck omnibus, fitted with C.A.V. dynamo lighting set, the price complete being £850. This type is built in conformity with the regulations of the Metropolitan Police, ensuring extreme silence, mobility, and rapidity in starting. The gear box has no meshing gear for forward speeds, chain wheels and chains are substituted, thus eliminating noise. The use of worm and wheel for the terminal drive gives further silence and efficiency. Bodies up to 12 ft. or 13 ft. can be fitted to this chassis. Two ratios of gear are offered, one being for ordinary town uses where the gradients are not severe, and the other for hilly rural roads. Other demonstration vehicles were a 20-H.P. 1½-ton 16-seat char-a-bancs. On the stand were shown a 20-H.P. 2-ton chassis (£430 without tyres), and a dismantled worm-driven back axle. The worm drive and differential are easily removable from the top for inspection, etc. The chassis of this company are very light at the ends, but extra strength is given at the points where the weight is carried. By avoiding unnecessary weight elsewhere the running costs are reduced. The chassis for loads of two tons weighs but 29 cwt. A unique feature in the gear box is that all running gear is covered in. The worm transmission and rear axle is guaranteed for two years; and the gear box parts and engine for 12 months. Through a coupling behind the clutch all parts can be taken down without disturbing the gear box. The cover of the gear box is ingeniously fitted with wing nuts, a great improvement on the ordinary type of cover with screw nuts. This 2-ton chassis is suitable for single-deck omnibuses or chars-a-bancs.

John I. Thornycroft and Company, Limited.—Large extensions to the Basingstoke works of this company (Caxton House, Westminster) have enabled them to more than double their output. They showed two representative examples of their latest vehicles. One—a 4-cylinder 30-H.P. type "K" lorry—has been built to the order of the Rochdale Equitable Society. It is fitted with Thornycroft solid rubber tires, which are guaranteed for 10,000 miles for 12 months. An Aveling patent weather screen and a special mechanically-operated hoisting gear are fitted. The vehicle is of the type accepted by the War Office as a subsidy model. Under the terms of the War Office subsidy scheme owners obtain a subsidy of £110. Messrs. Thornycroft have supplied to the War Office 18 of their type "K" subsidy lorries. Since then a number of these vehicles have been sold to private firms. It is worthy of note that Messrs. Thornycroft took the first prize of £500 in the War Office trials, 1901; gold and silver medals and War Office diploma for running on paraffin in the heavy vehicle trials, 1907, first and only prize, £750, in the War Office trials, 1909. Messrs. Thornycroft's second exhibit was one of 40 of their new 4-cylinder 20-24-H.P. worm-driven 35-cwt. delivery vans, which they have on order for Carter, Paterson, and Company. This order was secured against severe competition. Other carriers are large users of Thornycroft vehicles, notably the London and North Western Railway, who will shortly be running a fleet of 29 Thornycroft lorries (illustrated in this issue), and Pickfords, Limited, who are running about 26. The new worm-driven chassis is built in four models, those supplied to Carter, Paterson, Limited, being adapted to



Plan and Elevation of 2-Ton Straker and Squire Chassis.

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MOTOR TRAFFIC.

carry 35 cwt. in a van body. An interesting accessory shewn on this vehicle is a mileage recorder, fitted up on the near side of the vehicle, and which is driven by positive gear direct from the gear box, so that the breakdowns and errors which cause so much trouble with many ordinary speed and mileage recorders are avoided. Messrs. Thornycroft have established fully equipped repairs depots in Manchester and Leeds. Over 60 per cent. of the orders received last year were repeat orders.

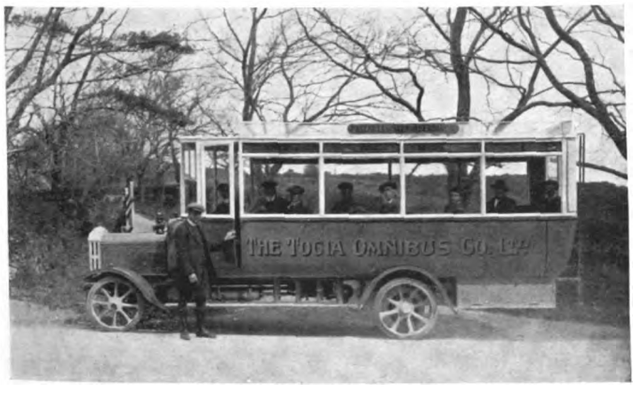
and South Western Railway, who will shortly be running 23 of these Karrier cars. The price is £570. The 4-cylinder engine produces 1,000 revolutions per minute; lubrication is by means of a gear-driven pump, the cylinders being supplied by spray from the crank shaft; the high-tension magneto is driven by enclosed gears from the engine, the carburettor is automatic; gears and differential contained in one box; three speeds and reverse, with a maximum of 12 miles per hour for goods vehicles, and 16 miles per hour for passenger cars; transmission

1-5-Ton Worm-Driven Express Vans by J. I. Thornycroft and Company.

Clayton and Company (Huddersfield), Limited.—This company is one of the four or five who specialise with one of their models to meet the requirements of the War Office as regards vehicles which will be suitable to take over for military use in the event of national emergency necessitating the mobilisation of the Reserve Forces. Buyers of these machines receive the subsidy of £110. One such wagon, of 45 H.P. for loads of 4½ tons, was exhibited. It has 4-speed and reverse gear box, live axle with double-reduction gear, constructed to allow of the gearing and differential to be dismantled without removing the body or the road wheels. The complete price is £760. Another exhibit was a 45 H.P. P.B./70 Karrier 28 to 34-passenger torpedo char-a-bancs, listed at £860 complete. A feature of this vehicle is that the front seat accommodates three passengers, the driver and guard, the latter being on the right of the driver. The 4-cylinder engine has the valves on one side with enclosed tappets. Lubrication is by universal-jointed cardan shaft and by silent side chains to driving wheels fixed on back axle; three internal expanding type brakes; wheel base 9 ft. 6 in., and 10 ft. 6 in.; track 5 ft. and 11 ft. 6 in. Although Clayton's were not exhibiting their "A" or overbody type, they are still making and selling as many of them as of the other types.

TIRES, WHEELS, ETC.

Space does not permit of a full description being given of the 23 stalls devoted to the display of solid rubber tires, wheels, rims, etc. In respect to tires, it must be said that they contribute in no small degree to the successful operation of heavy motors, and that the manufacturers have now extended their scope to the production of solid rubber tires for steam vehicles, thus reducing running costs and



"Karrier" Single-Deck Omnibus.

Thornycroft Parcel Van.

is by forced feed to all main bearings, and a pressure indicator is affixed to the dashboard. Other details include Bosch high-tension water-proof magneto; gears and differential in one self-contained casing with hardened and ground steel shafts running on Hoffman bearings; four speeds and reverse, the maximum being 16 miles per hour; transmission by silent-type side chains; internal expanding brakes on differential shafts and on rear wheel hubs; wheel base 13 ft. 6 in., track 5 ft. 3 in.; patent automatic carburettor. A third exhibit was a 25-H.P. 2-ton (nett) type B/50 parcels sheet van, one of seven cars on order for the London

extending the lives of the machines. Nowadays, the selection of a tire is a matter of no difficulty, for the makers guarantee a very large mileage.

The exhibitors of tires, wheels, and rims included the Avon India Rubber Company, J. W. and T. Connolly, Car Springs Limited, W. E. Cary, The Continental Tyre and Rubber Company, De Never Rubber and Tyre Company, Dunlop Rubber Company, Liga Tyres, C. Macintosh and Company, Midland Rubber Company, National Steam Car Company, North British Rubber Company, Peter

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MOTOR TRAFFIC.

Union Tyre Company, Russian Tyre and Rubber Import Company, Shrewsbury and Challiner Company, Leo Swain and Company (managers for the Polack Tyre and Rubber Company), Simplex Rubber Company, St. Helens Cable and Rubber Company.

The Avon India Rubber Company, Limited, of Manchester, with works at Melksham, Wiltshire, showed the Avon band tires for all classes of commercial vehicles. Those with special "B" sections are designed to withstand the severest conditions. Their "grip" or clinched-on solid tires are of a special quality of rubber, especially adapted for hard wear and durability, together with great resiliency. An exhibit of interest was the latest production of Avon pneumatic tires for commercial vehicles and light delivery vans in square and special grooved and studded patterns.

"T" make of the Continental Tyre Company. At the Commercial Vehicle Show at Olympia the Continental Tyre Company also claimed a large percentage over any other make.

At the Dunlop Rubber Company's stand were shown solid rubber tires for all kinds of commercial vehicles. The carrying capacity of the solid tires is up to 12 tons. The company also showed heavy wood wheels for motor lorries, omnibuses, etc. There were also specimens of Dunlop band tires which have run extraordinary mileages. India-rubber matting for footboards of vehicles, and hood cloth for hoods, canopies, etc., were also exhibited.

The Simplex Rubber Company's show of solid band tires was a noteworthy one, while their patrons include many of the leading traction companies. These tires are guaranteed for 10,000 miles, but in many cases they have made records of from 20,000 to 30,000 miles. The tires are made to carry loads of from one to five tons, and they are made for all varieties of petrol vehicles and also for steam wagons.

"Karrier" 2-Ton Parcels Vans.

"Karrier" Omnibus with Two Compartments.

Leyland Motor Fire Engine.

A new production is the Seymour patent band tire, shown by the St. Helens Cable Company, in which a layer of resilient rubber is introduced between the hard rubber tread and the steel band, to which the tire is attached.

A non-skidding device was shown by Chas. Macintosh and Company for fire engine appliances. It is a triple tire, the centre soft rubber one never wearing level with the outside harder tires.

At the Manchester Commercial Motor Show no less than 55 per cent. of the solid tires fitted to vehicles exhibited were of the popular

Leo Swain and Company, as managers for the Polack Tyre and Rubber Company, Limited, at Manchester, showed a full range of this company's tires for vehicles of from 1 to 12 tons. They are made from the finest Para rubber, a sample of which was exhibited. Other interesting exhibits were a number of discarded tires, with particulars

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MOTOR TRAFFIC.

of their mileage. A 6-ton Leyland petrol wagon's back tires did over 20,000 miles, and the front tires of a 6-ton vehicle had traversed 25,000 miles. The resiliency of the Polack tires renders them especially suitable for passenger vehicles.

Rims as well as tires were prominent on the Peter Union stand, a speciality being made of those for the heaviest type of vehicles. Both tires and rims are made for commercial and public service vehicles, the heaviest weight provided for being 13 tons. The company may thus claim to be public benefactors in that their products tend to lessen road wear and noise.

An improvement has been effected in T. C. Aveling's patent self-closing weather screen since it was illustrated in our columns on October 16 last. It is self-acting and can be regulated to any of the four positions without stopping the vehicle.

The Coventry Chain Company showed their roller and noiseless chains for road drives, cam shaft, magneto, and pump drives, and noiseless chain-driven change-speed gear boxes. These were fully dealt with in the issue of this journal dated November 14, 1912.

An interesting exhibit was that of Henry Watson and Sons, Newcastle-on-Tyne, makers of motor engines, which showed cylinders, pistons, etc.

The National Steam Car Company exhibited the Clarkson-Morison patent steel wheels which have given excellent results during two years in omnibus work in London. These wheels are designed to avoid dangers associated with cast-steel wheels, which on rough roads frequently fracture at the spoke-end. In a test a 2-in. wrought steel spoke was only crippled by a weight of 2½ tons, the electrically-welded joint portion of the spoke being quite uninjured.

A TRACTOR WITH CONTINENTAL TIRES.

An important step in tire construction extraordinary will be found of exceptional interest, particularly to users of heavy commercial motors and traction engines. Messrs. Pickfords, Limited, have just had one of their baby "giant" tractors fitted with solid tires of the "T" pattern, of the Continental Tyre and Rubber Company, Limited. The tires on the two large back wheels of the engine are of colossal

dimensions, being 1,500 mm. by 120 mm., and notwithstanding the great strain they are subjected to, which is intensified by their unusual size, the tires give every evidence of sustaining the high reputation of the ordinary size "T" pattern. Added interest attaches to this new departure in solid tire construction when associated with the recent production by this firm of a pneumatic tire of abnormal size, measuring 965 mm. by 175 mm. and intended for use on limousine cars. A photograph of the baby "giant" tractor equipped with the large tires referred to is given above.

An Offer to Hastings Corporation.—On January 16, Greater Omnibus Services, Limited, wrote to Hastings Corporation offering to run omnibuses on the esplanade route, where surface-contact tramways are being displaced by petrol-electric tramcars, and the Council decided to pass to the next business, the Mayor remarking that the Licensing Committee would know how to deal with the application for licences.

ORDERS FOR AVON BAND TIRES.

The Avon India Rubber Company, Limited, have received an order from the Great Western Railway for the tiring of their motor omnibuses with Avon band tires during the ensuing 12 months. The Avon Company have also a large contract from the Great Western Railway for the supply of mechanical rubber goods for railway purposes covering the same period. The company report that they have secured a very satisfactory proportion of business for public service vehicles, a gratifying indication that Avon tires satisfactorily meet the requirements of the riding public and the owners of the vehicles. Avon band tires, principally of the new "B" type, are fitted to the passenger char-a-bancs of the Grimsby Provincial Tramways Company, to the electric repair towers of the Stretford Urban District Council, to the motor fire engines of the Derby Corporation and Surbiton Fire Brigade. On London General omnibuses, where a number of sets are running under close observation, 12 Avon tires recently gave an average of over 25,000 miles each, and three or four were still running at the time the records were analysed.

MOTOR TRAFFIC NOTES.

International Tourist Trophy Race Entries.—Twenty-three entries have so far been received for the 1914 race in the Isle of Man, including two Straker Squire cars entered by Sidney Straker and Squire, Limited.

Parade of Commercial Vehicles in Edinburgh.—In connection with the Scottish Motor Show at Edinburgh, the Scottish Commer Car Company arranged a parade of commercial vehicles in George Street on January 26.

Leyland Chars-a-Bancs for Northwich.—The Mid-Cheshire Omnibus Company, Northwich, have ordered two more chars-a-bancs from Leyland Motors, Ltd., making five Leyland vehicles now on order, three of the number being single-deck omnibuses.

Manchester Suburb Petitioning for Omnibus.—A committee have been formed to present a petition to the Manchester Tramways Committee, asking for a motor omnibus service to link up tramway routes and Burnage and Didsbury with the Cheadle district.

A Four-Wheel Brake.—Argylls Limited announce that they are prepared to enter any trial of brake systems that may be organised in any part of the country on one of the worst stretches of roadway available, for the purpose of demonstrating the value of their 4-wheel system.

Trolley and Motor Omnibuses for York.—A town's meeting has sanctioned the railless trolley car and motor omnibus clauses of the Parliamentary bill promoted by York Corporation in order to provide means of transport in districts where tramway extensions are not practicable.

C.A.V. Lighting Sets at the Edinburgh Show.—Of the total lighting sets exhibited on private cars at the Scottish Motor Show at Edinburgh, 63 were the C.A.V., supplied by C. A. Vandervell and Company, Limited, of Acton, W. The remaining 48 sets were apparently of eight different makes.

Bournemouth Council to Run Omnibuses. The Corporation have adopted a recommendation presented by the Tramways Committee, after consideration of the manager's report, for application to be made to borrow £4,000 for the purpose of running motor omnibuses in connection with the tramways on three routes.

Cars for Municipal Work at Glasgow.—The Corporation at their January meeting agreed to purchase four motor cars costing between £650 and £680 each. In view of the extra work involved in conveying magistrates to the police courts, it was also agreed to obtain two additional cars at £600 and £696 respectively.

Municipal Motor Wagons.—Westminster City Council have decided to replace all their horses by motor wagons. Twenty of these vehicles are now in operation, and four are on order for the work of refuse collection and street watering. The cost per ton by motor wagon is 2s. 9d., as against 3s. 10d. by horsed vehicles.

Dearne Valley Omnibus Suggestion. -A light railways and electric lighting scheme is being promoted by the Urban Councils of Wath, Wombwell, Bolton, and Thurnscoe. At a recent meeting of Wath Council, Mr. Godber moved that the Council withdraw from the project, which, he said, meant an outlay of £240,000. He suggested that suitable communication with other districts could be provided by means of a service of motor omnibuses, at a cost of £7,000. By five votes to three the motion was rejected.

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MOTOR TRAFFIC.

OLYMPIA MOTOR EXHIBITION POSTER COMPETITION.—The Society of Motor Manufacturers and Traders are offering a prize of 100 guineas for a sketch for a poster suitable for advertising the Olympia Motor Exhibition. Sketches submitted must in size be 40 in. by 50 in. (upright) must be suitable for reproduction by lithography in not more than eight printings; and must embody, or make provision for, the following wording: "International Motor Exhibition, Olympia," and the date. February 28 is the latest time for the receipt of designs.

OMNIBUSES FOR FOLKESTONE.—After having for years proved undecided on the question of introducing tramways, the authorities recently have given attention to proposals for introducing railless trolley cars. The Corporation have now, however, granted licences to a company to run 12 motor omnibuses, which will, it is understood, be of the Tilling-Stevens petrol-electric type. Members of the Corporation recently visited the works of W. A. Stevens, Limited, at Maidstone, when surprise was expressed that so extensive an industry existed in Kent.

MANCHESTER'S NEW OMNIBUSES.—The accompanying illustration shows the first of the new type of motor omnibus supplied to the Manchester Corporation Tramways by the Daimler Company of Coventry. The chassis is exactly similar to the eight previously supplied; the body, however, is of the "Allen" Type, a registered design built by Christopher Dodson, Limited, of London, and referred to on page 139 of this issue.

ORDERS FOR OMNIBUSES.—Edinburgh Corporation have placed an order with Leyland Motors, Limited, Leyland, Lancashire, for three motor omnibuses, and with W. A. Stevens, Limited, 26, Victoria Street, London, for three Tilling-Stevens petrol-electric omnibuses. A number of tenders were received by the Tramways Committee on January 21, the prices at which vehicles were offered ranging, in the case of single-deck cars, from £719 to £1,275, and in the case of double-deck cars from £709 to £938. Before coming to a decision the committee adjourned in order to take expert advice, and a week later contracts were awarded as stated above.

OPENINGS FOR OMNIBUS MANUFACTURERS.—Councillor Garghan, at the January meeting of the Widnes Council, drew attention to the loss on the motor omnibus service. Last year the committee estimated to run 53,000 miles, and instead of this, the running totalled 56,000, and for every mile they had lost 6d. The present type of vehicle was unsuitable. From inquiries made at Warrington he gathered that the cost of running there was 11d., with the receipts at 10d. Councillor Hamilton said the committee had considered various schemes to make the business pay. Ths type of omnibus did not suit their requirements, but they had got to make the best of the vehicles.

Daimler 40-h.p. Omnibus with Dodson Body for Manchester Corporation Tramways.

ELECTRIC OMNIBUSES FOR NEW YORK.—The Board of Estimates at New York are considering an application made by the People's Five-Cent Omnibus Company for a franchise to place electric omnibuses on 20 routes in New York City. Evidence was given in support of the application by Mr. F. W. Smith, president of the Electric Vehicle Association of America, who spoke of the ease of operation of electric vehicles and their simplicity of control. Mr. Smith also mentioned that 2,100 electric trucks, belonging to 500 persons, were in use in New York City.

OMNIBUSES FOR TESTING ROUTES AT CHESTERFIELD.—In connection with the railless traction powers secured by the Council last year, trials of the respective routes are to be made with motor omnibuses before the installation of overhead equipment for railless vehicles is embarked upon. The Corporation have on order six Daimler omnibuses of the type in use in the outskirts of Sheffield, and these are promised for delivery in the spring. The power-station is to be enlarged and the plant increased, and the car shed is to be extended to provide accommodation for the omnibuses and three double-deck tramcars.

RIVAL TRANSPORT COMPANIES AT MIDDLESBROUGH.—A new organisation known as the Middlesbrough Motor Transport Company has been granted two licences by the Northumberland County Council. It is intended to place a dozen Daimler omnibuses on various routes, to provide a passenger, goods, and fish service between Middlesbrough and the Hartlepools, and also to cater by motor cars and chars-a-bancs for the pleasure seekers of Cleveland and south-east Durham.—The Middlesbrough, Stockton, and Thornaby Tramways Company have since announced that they have under construction a number of motor omnibuses, and have made all arrangements for starting a service in the spring.

DUNLOP TIRES ON PRIVATE CARS.—Of the 800 odd tires fitted to cars at the Scottish Motor Exhibition recently held at Edinburgh 555 were Dunlops, all other makes totalling 272. At the three officially recognised motor shows—London, Manchester, and Edinburgh—Dunlops have outnumbered all other makes combined, as these figures show:

	Dunlop.	Other makes.
London	1,400	.. 1,056
Manchester	417	.. 318
Edinburgh	555	.. 272

Dunlop tires thus exceeded all others, British and foreign, by 726 (2,372 to 1,646).

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THE

Tramway & Railway World

Vol. XXXV. No. 9.] LONDON, SATURDAY, FEBRUARY 14, 1914. [Established in 1892.

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

ABERDARE URBAN DISTRICT COUNCIL.

The above Council invite tenders for :—

Section A.—The construction, supply, and erection of Transformer, High and Low Tension Switchgear and Instruments.

Section B.—The supply and delivery of Cables and Feeder Pillar.

Sealed tenders, upon the form supplied, endorsed "Aberaman Electricity Supply," must be delivered to the undersigned not later than noon on the 28th day of February, 1914.

The Council do not bind themselves to accept the lowest or any tender.

Dated this 11th day of February, 1914.

D. LLEWELLYN GRIFFITHS,
Clerk to the Council.

Town Hall, Aberdare.

COUNTY BOROUGH OF BOLTON.

TRAMWAYS DEPARTMENT.

The Tramways Committee of the Bolton Corporation invite tenders for the following Materials and Stores for the year ending March 31, 1915.

Varnish.
Trolley Pole Sundries.
Overhead Material.
Gear and Pinion Wheels.
Brake Blocks, Iron Castings, and Malleable Iron Castings.
Motor and Axle Grease.
Waste and Sponge Cloths.
Lighting Material, Mica, Fibre, I.R. Channel, Press-phan.

Forms and specifications of tenders may be obtained on application to Mr. John Barnard, General Manager, Corporation Tramways, Bradshawgate, Bolton, on and after Monday next, February 9, 1914. Sealed tenders, on forms provided, endorsed "———— Contract," to be addressed to the Chairman of the Tramways Committee, Tramways Office, Bradshawgate, Bolton, and must be delivered not later than Monday, February 23, 1914.

The Committee do not bind themselves to accept the lowest or any tender.

SAMUEL PARKER,
Town Clerk.

Town Hall, Bolton,
February 4, 1914.

COUNTY BOROUGH OF BLACKBURN.

TRAMWAYS DEPARTMENT.

Tenders are invited for the supply of Iron, Steel, Bolts, Nuts, etc.

List may be had on application to the undersigned.

J. H. COWELL,
General Manager.

Tramway Office, Blackburn.

COUNTY BOROUGH OF BURTON-UPON-TRENT.

ELECTRICITY DEPARTMENT.

The Corporation of Burton-upon-Trent invite tenders for the supply, delivery, and erection of the following plant required in their Electricity Department :—

Contract No. 22.—One 1,250 kw. 3-phase Turbine Alternator and Condenser.

Contract No. 23.—Pipework, Valves and Accessories in Connection with above Plant.

Contract No. 24.—Extensions to Existing High-tension Switchboard.

Single copies of specifications and conditions may be obtained from the undersigned on payment of £1, which will be returned on receipt of a *bonâ-fide* tender.

Sealed tenders, endorsed "Contract No. —," must be addressed to the Chairman of the Electricity Committee, and delivered to me not later than noon on Saturday, March 14, 1914.

No tender will be accepted from any party who pays his employees (whether artisans or labourers) less than the standard rate of wages paid in this borough, or who does not conform to the hours and conditions of labour generally recognised in each branch of the industry affected, and clauses to ensure payment of the standard rate of wages, etc., for work done under the proposed contract will be inserted in the contract.

Only tenders that are made out on the forms which may be obtained from the undersigned on application will be considered.

The Corporation do not bind themselves to accept the lowest or any tender, and parties tendering must do so at their own expense.

THOMAS HALL,
Borough Electrical Engineer and Tramways Engineer.

Guild Street, Burton-upon-Trent,
February 11, 1914.

THE RURAL DISTRICT COUNCIL OF DAVENTRY.

STEAM TRACTOR WITH 2 TRAILERS.

The Rural District Council of Daventry invite tenders for supplying them with a Steam Tractor and 2 6-tons Trailers.

The bottoms of the trailers to be plated with sheet iron and the width of the wheels to be not less than 6 inches.

For further particulars apply to the Surveyor of the Council (Mr. W. W. Band, Newnham, Daventry).

Tenders, accompanied with specifications, to be sent to me on or before the 21st inst.

The Council do not bind themselves to accept the lowest or any tender.

By order, J. D. SPEARING,
Clerk of the Council.

The Moot Hall, Daventry,
February 7, 1914.

KENT COUNTY COUNCIL.

PETROL MOTOR LORRIES.

The Bridges and Roads Committee of the County Council invite tenders for the supply of Six Petrol-Driven Motor Lorries. The Bodies to be constructed of Steel, with End-Tipping Gear, and capable of carrying a load of five cubic yards.

Specification and forms of tender can be obtained upon application to the County Surveyor, Maidstone.

Sealed tenders, endorsed "Tender for Petrol Motors," must be sent to the undersigned (upon the prescribed form) not later than 12 noon on Saturday, February 28.

The Committee reserve the right to apportion the order as they may feel disposed.

The lowest or any tender will not necessarily be accepted.

W. B. PROSSER,
Clerk to the Council.

Sessions House, Maidstone,
February, 1914.

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RUGBY URBAN DISTRICT COUNCIL.

The above Council are prepared to receive tenders for the supply and delivery at their Fire Station of a Shand-Mason Double Vertical, Variable Expansion, Steam Fire Engine complete, with the usual Accessories, Brakes, Lamps, Head Lamp, and 23 feet of Suction Pipe, capable of delivering 400 gallons per minute, and of throwing to a height of 160 feet through a 1⅛in. to 1 3-16in. jet pipe.

Sealed tenders, endorsed "Steam Fire Engine," addressed to Mr. A. Morson, Clerk to the Council, Benn Buildings, High Street, Rugby, to be delivered at his office not later than first post Tuesday morning, the 17th inst.

The Council do not bind themselves to accept the lowest or any tender.

By order, JNO. H. SHARP,
Engineer and Surveyor.

Benn Buildings, High Street, Rugby,
February 7, 1914.

SHIPLEY URBAN DISTRICT COUNCIL.

STEEL GIRDER TRAM RAILS AND FISHPLATES.

The Council invite tenders for the supply and delivery at Shipley Midland Railway Station, of Steel Girder Tram Rails and Fishplates.

Conditions of contract, specification, and form of tender may be obtained at the office of Mr. W. H. Dawson, Engineer to the Council, Manor House, Shipley.

Sealed tenders, marked "Tender for Steel Tram Rails," to be sent to me before 10 a.m. on Tuesday, February 24, 1914.

The contract will be let subject to the fair contract clauses of the Council.

The Council do not bind themselves to accept the lowest or any tender.

ISAAC LINDOW,
Clerk to the Council.

Manor House, Shipley,
February 6, 1914.

COUNTY BOROUGH OF WIGAN.

The Corporation of Wigan invite tenders for the supply of Tickets required by the Tramways Department of the Corporation during the twelve months commencing on April 1, 1914.

Further particulars may be obtained on application to Mr. Frank Buckley, Traffic Manager, Wigan.

Sealed tenders, endorsed "Tickets," must be delivered to me not later than Monday, the 23rd instant.

The Corporation do not bind themselves to accept the lowest or any tender.

WILLIAM HENRY TYRER,
Town Clerk.

Town Clerk's Office, Wigan,
February 9, 1914.

(Continued on page 156.)

POLE PAINTS

which keep their colour and prevent rust. Kearsley's ready-mixed Pole Paints are used by important Tramway Companies the world over, and give entirely satisfactory results under extreme climatic conditions.

Robert KEARSLEY & Co., Ltd.
RIPON, England.

SIMPLEX CONDUITS, Ltd.

GARRISON LANE, BIRMINGHAM.

Makers of Simplex Steel Conduit System and

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TRAMCAR HEATERS.
TRAMCAR METERS.

MEASURING INSTRUMENTS.
WATERTIGHT FITTINGS FOR CAR SHEDS.
ENCLOSED (Indicating) FUSES (to N.E. Code or English Standard).

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THE SANITARY WOOD PAVING

REGISTERED TRADE MARK M.J.

Telegrams: "JARRAH, LONDON."

Telephone: 368, LONDON WALL.

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PINCHIN JOHNSON & CO., Ltd.,

MINERVA HOUSE,

BEVIS MARKS, LONDON, E.C.

The "Peacock" Improved Brake.

THE "PEACOCK" BRAKE CO.,

27, CLEMENTS LANE, LONDON, E.C.

Telephone No.: 5735 CENTRAL.

Telegraphic Address: "INBRAKE," LONDON.

British, Foreign and Colonial Representatives:—

BRITISH ISLES. W. C. Knight, 75, Surrey Street Sheffield. Wm. C. Yuille & Co., 60, Brown St., Anderston, Glasgow. Equipment & Supplies, Ltd., 7, Anglesea Street, Dublin.

FRANCE. Chas. d'Albert, 15, Avenue Larcher, Chatou (S & O).

GERMANY. Heinrich Vellguth, 1, Glockengies-serwall, Hamburg.

BELGIUM. l'Anglo-Belge Electrique, 72, Avenue de Tervueren, Brussels.

SWEDEN. E. & L. Davidson, Grefmagnigatan 15, Stockholm.

SWITZERLAND. G. Sigerist, 8, Mitti. Haldenstrasse, Winterthur.

ITALY. Chas. de Grave Sells, 5, Via Ponte Calvi, Genoa.

SPAIN. Peninsular Engineering Co., Puerta del Angel 10, Barcelona.

SOUTH AFRICA. F. Peabody Rice, 22, Standard Bank Buildings, Johannesburg.

AUSTRALIA. H. A. E. Rothwell, Cromwell Buildings, Bourke Street, Melbourne, Victoria.

NEW ZEALAND. James Jackson, Box 731, G.P.O., Wellington.

JAPAN. W. M. Rooke & Co., 184, 5 Chome, Nakanoshima, Osaka.

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THE
Tramway and Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.
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One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, FEBRUARY 14, 1914.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

THE COST TO TRAMWAYS OF MOTOR TRAFFIC.

Ever since heavy motor traffic began on the streets and roads of this country road authorities have complained of the extra cost to which they have been put for road repairs rendered necessary owing to the wear caused by heavy vehicles being driven at very considerable speeds. In the case of motor lorries, nothing has been done to obtain a contribution to road maintenance. As to motor omnibuses attempts have been made, but with little or no success. In the case of the trackless trolley system, certain rates of contribution have in some cases been fixed, as the promoters of such schemes have to get Parliamentary sanction. While figures have in a number of cases been published by county councils as to the increased cost of maintenance of rural roads, little or nothing has been done to provide approximately correct estimates of the added cost to tramway undertakings for the maintenance of the tramway area of streets owing to the prevalence of heavy motor vehicles. At length we have some valuable figures, and they are the more valuable, because they relate to the county of London, which is pervaded by heavy motor vehicles in enormous numbers. It appears that the London tramway department have experienced much trouble in connection with the repair of the street surface between the rails and tracks, in consequence of the fact that the rubber tyres of motor vehicles suck the cement grouting out from between the paving setts. To overcome this, recourse has been had to bitumen grouting, and according to figures presented by the Highways Committee to the County Council last Tuesday this means an added cost of about £20,000 a year. Then there is the evil of setts being abraded and crushed by the iron tyres of heavy motor lorries. This trouble is at present specially apparent on about 17 miles of single track, and it is likely to spread. At present it means an added cost of about £5,200 a year for repairs. In addition to these things, the cost of paving works over the whole tramway street area shows an increase of about £16,500 a year compared with the cost under conditions existing before motor traffic reached its present dimensions. A large part of this item of cost doubtless is due to motor omnibus traffic. The total additional annual expenditure therefore thrown on the London tramway system owing to motor traffic is at present about £41,700 a year, and the figure is increasing. It is important to note that this figure is for paving repairs alone. The County Council tramway system extends over 141 miles of route, mostly double track, so that the added cost of street maintenance is equal to no less than £295 per annum per mile of street in which there are tramways. The number of car miles run on the system during the year ended March 31 last was practically 54,000,000, so that the added cost of £41,700 means .185d.—nearly a fifth of a penny—per car mile. This is no insignificant part of the total working expenses for the same year of 6.62d. per car mile. Moreover, no account is taken of any extra cost in respect of crushed foundations or sinking of rails. The owners of petrol motor vehicles point to the petrol tax as their contribution to road maintenance. It is a question whether the proceeds of that tax would be sufficient if all the tax on the petrol consumed by vehicles on London streets went to the authorities who maintain the surface—the County Council and the borough councils. But it does not; it goes into a central fund for the whole country, and one of the complaints of the Highways Committee of the County Council is that the grants out of the fund by the Road Board to London are quite insufficient. Some figures have recently been put forward in the daily press to show that there is a decrease in the cost of the roads and streets to metropolitan borough councils. Examination, however, shows that this saving is confined to the scavenging department. The substitution of motor for horse vehicles, of course, diminishes the need for road sweeping and washing. Moreover, at great expense, wood-paving and tar macadam have been substituted for water-bound surfaces, and comparatively little requires to be done to keep these new surfaces clean. This point has no bearing on the situation in which tramway authorities find themselves. They are not responsible for cleaning, but are heavily responsible for repairs and renewals of paving.

STREET MAINTENANCE AND MOTOR TRAFFIC.

At a meeting of the London County Council on Tuesday last, long reports were submitted by the Highways Committee, the Improvements Committee, and the General Purposes Committee on the subject of road maintenance, and of grants from the Road Board. The Highways Committee in their report stated that motor traffic (particularly rubber-tyred vehicles) had injuriously affected the cement grouting in connection with repairs of the paving in the tramway tracks, and heavy motor tractors caused undue abrasion and crushing of the granite setts. The use of the more expensive bitumen grouting had recently been adopted in order that the sucking action of the rubber-tyred vehicles would be counteracted. It was estimated that the extra cost entailed by the use of bituminous grouting amounted to about £20,000 a year, and this would increase. It was also estimated that the extra cost of paving works due to setts being crushed by heavy motor lorries would be about £5,200 during the current financial year. About 17 miles of single track were at present affected in this way, and any expansion of heavy motor traffic would increase this figure in the future. The cost of paving works affecting the tramway area showed an increase of about £16,500 a year compared with the cost under conditions existing before motor traffic reached its present dimensions. The total additional annual expenditure, therefore, borne by the tramway undertaking in respect of the extra cost of paving works due to the effect of motor traffic was

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about £41,700, and the figure was likely to increase. The saving effected by the metropolitan borough councils owing to the maintenance of the tramway tracks by the County Council was estimated at over £125,000 a year. After detailing the additional cost for paving in Blackwall and Rotherhithe tunnels, and on Battersea and Putney bridges, the Committee stated that in their opinion the Council had a good case to support an application to the Road Board for a contribution towards the extra cost to which the Council had been put in recent years.

The Improvements Committee in their report detailed various street improvements which were desirable, and for which application had been made to the Road Board for grants. The Road Board made a long written reply, which stated that the grants promised for works affecting Greater London already exceeded the portion of the available receipts which on the basis of population could be allocated to that area. It was also stated that the schemes put forward by the Council were within the category of widening of streets congested mainly with local traffic, and were, therefore, not fairly within the scope of the Road Improvement Fund. The Board were considering what was the best procedure for affording an opportunity to the Council and the borough councils to represent their views on the subject. The Committee, after reviewing all the circumstances at great length, recommended the Council to express the opinion that in the general allocation of grants from the Road Improvement Fund the administrative County of London should be treated as a separate area, and not merely as a part of Greater London; that the amount of the grants hitherto made to London authorities was quite inadequate and could not be regarded as satisfying the legitimate claims of the County of London; and that the Council regretted to learn that it was apparently the intention of the Road Board to devote the portion of its funds available for London solely to road crust works, and to withhold entirely from the Council grants for London street improvements irrespective of their urgency or their value for through traffic.

The General Purposes Committee in their report, concurring with the Improvements Committee, recommended that the Council did not see its way to participate in a conference of highway authorities in Greater London suggested by the Road Board, and that the Road Board be asked whether it still suggests a public inquiry on the subject of the distribution by the Board of its available funds, and if so, on what lines it is proposed that it should be conducted.

These reports were after considerable discussion adopted.

LARGE RAIL CONTRACT FOR LONDON.

At last Tuesday's meeting of the London County Council, the Highways Committee reported that they had considered the following tenders received for the supply of 500 tons of slot rails and 1,000 tons of conductor rails, and 6,300 tons of track rails and fastenings required in connection with the construction and reconstruction of further portions of the tramways and for maintenance purposes :—

SLOT RAILS AND CONDUCTOR RAILS.

	£ s.
Frodingham Iron and Steel Co.	13,150 0
P. and W. MacLellan (rails manufactured by North Eastern Steel Co.)	13,706 5
Watlington and Co. (rails manufactured by Phœnix Actien-Gesellschaft, at Ruhrort, Germany)	14,137 10
Walter Scott, Limited	16,475 0

The chief engineer's estimate was £13,525.

TRACK RAILS AND FASTENINGS.

	Carbon Steel. £ s. d.	High-silicon steel. £ s. d.
Watlington and Co. (rails manufactured by Phœnix Actien-Gesellschaft, at Ruhrort, Germany)	30,202 7 6	39,893 7 6 (Tender not to specification).
Bolckow, Vaughan and Co.	30,796 5 0 (Tender for special steel, £40,571 5s.)	41,296 5 0
Walter Scott, Limited	41,920 10 0	43,470 10 0
P. and W. MacLellan (rails manufactured by North Eastern Steel Co.)	43,163 2 6	44,670 12 6 (Not including bolts and nuts).
Barrow Haematite Steel Co.	45,979 5 0	(No tender.)

The chief engineer's estimates were £47,131 15s. for rails of carbon steel, and £48,631 15s. for rails of high silicon steel.

The Committee recommended that the tender of the Frodingham Iron and Steel Company for the slot rails and conductor rails should be accepted. In regard to the track rails, the Committee had come to the conclusion that for the quantity now asked, it would be advisable to have the rails made of carbon steel, and they recommended the acceptance of the tender of Bolckow, Vaughan and Company at £30,796 5s. It was also proposed that Bolckow, Vaughan and Company be allowed to sublet to Guest, Keen and Nettlefolds the supply of bolts and nuts.

The recommendations were adopted.

Success of the Tramways (M.E.T.) Omnibus Company.—This company are making an issue of £100,000 4½ per cent. guaranteed debenture stock at 92. The company owns 350 motor omnibuses worked by the London General Omnibus Company. During 1913 the Tramways (M.E.T.) Omnibus Company states that they had a working profit of over £50,000. The annual sum required for the whole of the company's debenture stock amounts to £14 000. The debenture stock is a specific first charge on the company's uncalled capital amounting to £190,000, and the principal, interest, and sinking fund of the stock are guaranteed unconditionally by the Metropolitan Electric Tramways, Limited.

DUNDEE EMPLOYEES AND THEIR WORK.

Judging by what has taken place at Dundee, municipal tramway employees are in danger of forgetting that they are engaged for the purpose of working tramways. For some months past, Mr. Peter Fisher, the manager, has been attempting to meet their wishes in re-arranging relief tables in fulfilment of an undertaking given by the Tramways Committee, and he summarises the various schemes which have been dealt with as follow :—

A scheme, suggested by the secretary of the men's Union, to include the early morning cars in the ordinary duties was worked out, and submitted to, and rejected by, the men's representatives.

A scheme, which is in operation in Hull, and apparently much thought of by the Hull employees, was submitted to the men, and rejected.

A set of duties and reliefs applicable to the Lochee Road route was suggested by the men's representatives. The only new principle in this proposal is that a 48-hours week is substituted for a 54-hours week, at a cost of £1,854 per annum. The manager offered to submit this proposal at once to the Tramways Committee, but the men would not agree.

Another complete set of tables was prepared by the manager and submitted for consideration. The men's representatives gave considerable assistance in revising and altering these tables, but ultimately rejected them.

Every suggestion put forward by the men has been taken up and worked out with the greatest care, but every known scheme has been sent for and submitted, only to be rejected. The men have been invited to point to any system where the conditions were more in accordance with their views than that of Dundee. Hull and Manchester were suggested by the men, but in both of these cases there were features more objectionable than anything that exists in Dundee.

The employees, moreover, were not prepared to consider changes which have been introduced in Aberdeen. Mr. Fisher concludes that the alleged grievances do not apply to Dundee in particular, but to tramway conditions generally, and he has submitted to the Committee a series of tables made up on the basis of a 54-hour week, and, with the exception of a few special reliefs, there was no extra cost. More money would be spent in wages, but additional runs would be made in return for the extra expenditure. In these tables Mr. Fisher had endeavoured to meet every possible objection, and under them the following results would be achieved :—(1) Long spread-overs would be done away with; (2) there would be no short meal reliefs; (3) the men on duty at night would not be on duty early in the morning; (4) the question of irregularity of meal times had been met, and the views of the Board of Trade complied with.

In presenting the scheme to the Committee the manager stated that they need have no hesitation in submitting it to any competent authority or tribunal. It is satisfactory to find that the Committee have instructed the manager to bring the duties and reliefs into operation, and that the chairman and Councillor Buist made some observations calculated to impress upon the men the fact that they are wage-earners, and not employers. The men had expressed a desire that their representatives should be present during the discussion, but the chairman observed that it would be as much out of place to have them there as it would be for the committee to be represented at a meeting of the men. Councillor Buist remarked that if it was a question of wages, and the men were disappointed that Mr. Fisher has been able to bring forward such a complete scheme without touching upon wages or curtailment of hours, they might have been straightforward and honest, and said it was an increase of wages and a reduction of hours they wanted. According to an analysis made by the chairman of the number of hours over which the duties are to be spread it appears that out of 400 men four men will have from 8 to 9 hours; five from 9 to 10 hours; 147 from 10 to 11 hours; 204 from 11 to 12 hours; 31 from 12 to 13 hours; and 9 from 13 hours 5 minutes to 13 hours 20 minutes. The average "spread" is 10 to 12 hours. Councillor Buist emphasised the benefits of the new duties by stating that the men would be given regularity of hours which they did not have before, that they would have sufficient time for their meals, and that in place of two nights a week off earlier they would now get off every night for a whole week at a time. No doubt when the scheme is in operation the committee will be willing to remedy where practicable any shortcomings that may become apparent, but when that is done grumblers should be told to seek other means of gaining a livelihood.

On February 5 the Town Council by 26 votes to 4 approved of Mr. Fisher's report. Councillor Spence said he did not hesitate to assert that the grievances were confined to a small minority, and that minority were being encouraged and egged on in their discontent from within the Council. More than once the leaders had left satisfied with what was arranged, but afterwards, "the snake in the grass having crossed their path," their view changed. Bailie Macdonald deemed it necessary to remind the Council that the tramways belonged to the community and not to the men.

Stirling Tramways and Electrification.—Stirling Council on February 10 decided to call for a further report on the proposal of Mr. George Balfour to purchase the electricity undertaking for £32,000, to reduce the charges for current during the next six years, and to electrify the tramways. The Council were advised that a complete system of broad gauge tramways could be constructed at a total cost of £74,000, with a reasonable certainty of financial success.

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MISCELLANEOUS NEWS AND NOTES.

Trackless System for Nelson.—The Town Council have decided to adopt the trackless trolley system for the higher parts of the town. Two routes are proposed at an estimated cost of £6,678.

New Cars for Aberdare.—Traffic has increased so much on the new tramway system at Aberdare that the Council decided on February 9 to purchase four double-deck cars at a cost of £2,850.

Messrs. Imeson and Finch, contractors and manufacturing engineers, of Alma Chambers, Stockton-on-Tees, have removed their offices to their works, and their only address is now Empress Works, Stockton-on-Tees.

Light Railway Order.—The Board of Trade have confirmed the following order made by the Light Railway Commissioners:—Merthyr Tydfil Light Railway (Amendment) Order, 1914, amending the Merthyr Tydfil Light Railway Order, 1899.

Hatpin By-Law at Cardiff.—By 23 votes to six the City Council on February 9 adopted a by-law requiring any female person wearing a hatpin in any street or public meeting place to cause the point to be properly protected by a blunt guard of metallic or other material.

Omnibus Licences Refused at Grimsby.—The Town Council on February 6 refused to grant an application for licences to run a motor omnibus service, on the ground that it was not conducive to the safety of the public to have motor omnibuses using the narrow streets already occupied by the tramways.

New Car Sheds for Aberdeen.—The Aberdeen Tramways Committee have recommended the Corporation to adopt a scheme for acquiring militia barracks in King Street from Aberdeen County Council for the purpose of erecting on the site new car sheds, workshops, and offices at a cost of about £26,000.

Season Tickets Proposed for London.—At the meeting of London County Council on Tuesday a discussion took place on a motion by Mr. Dew to ask the Highways Committee to report as to the advisability of introducing a system of season tickets on the tramways. The debate had not concluded when the Council adjourned.

Glasgow and Route Numbers.—The Tramways Committee having reported against a proposal to number the car routes on the ground that numbers would only complicate matters, there was some discussion on their action at the February meeting of the Corporation. In the end Convener Kirkland agreed to take back the report

Hove and Railless Trolley Traction.—In view of the approaching installation of railless trolley traction in Brighton and Hove, a committee of the Corporation of the latter town have recommended the acceptance of an offer by the Cedes Electric Traction Limited to erect a trial installation of their system in Goldstone Villas, George Street, and part of Church Road.

Football Traffic Record at Glasgow.—To provide accommodation for the large number of passengers, mainly the crowds who were attending the various important football matches in the city, the tramways department ran 781 cars on February 10. This was a record in the history of the department. The usual number on a Saturday at this season of the year is about 770.

Liverpool Experiment to Relieve Congestion.—On February 9 a new belt tramway route between Tunnel Road and Old Haymarket was inaugurated as an experimental supplementary belt service, provided to deal with the congestion on the Smithdown Road route between Lodge Lane and the centre of the city and on the Wavertree route between Tunnel Road and the city.

South Shields to Purchase Omnibuses.—Authority was given on February 10 to the chairman, vice-chairman, and tramways manager of the South Shields Council to visit London and any other place for the purpose of inquiring into the best type of omnibus to adopt for the service to be instituted from Stanhope Road tramways to the borough boundary at Simonside.

New Fare Suggestion at Glasgow.—In a discussion by Glasgow Council on the Tramways Committee's recommendation regarding the question of the allowance to be made for depreciation in the tramway accounts for the year ending in May next, Councillor Alexander supported the minute, and held that the best thing that could be done was to pay off the loans as quickly as possible, and enable the tramways to supply the people with transit at the price of wages. Councillor Kirkland explained that it was customary at this time to consider the question of depreciation to enable the officials to prepare the financial statement at the end of May.

Damage to Track by Motor Lorries.—In their annual report the directors of the Paisley District Tramways Company state that an increase of £5,807 in the expenses during 1913, as compared with 1912, was "largely due to damage caused by the increasing heavy traffic of motor lorries and other heavy traffic. The matter is engaging the very serious attention of the directors, but they regret to say that during the current year they do not anticipate any relief in this respect. A dividend on the ordinary shares was paid for the first six months of the year at the rate of 2 per cent., but owing to this heavy expenditure they think it advisable not to pay any further amount this year, but to increase the carry forward."

Fares Not to be Reduced at Sheffield.—The City Council on February 11 adopted a report by the Tramways Committee stating that they could not at present recommend any reduction of fares. They based their decision on a detailed statement by the manager, which showed that halfpenny fares for workmen would swallow virtually the whole of the profits and involve an increase of 4d. in the pound in the rates. Socialist members raised the point whether it was better that profits should be used for cheapening fares for workmen or for reducing rates, which affected working people only to a small extent. Sir William Clegg, chairman of the committee, said that the tramways belonged to the whole community, who found the capital. They were responsible for its repayment, and were entitled to be considered. At present they got only 2 per cent. return on their capital. The users of the tramways had facilities and cheapness which would compare with those of any other city, not excluding Glasgow and Hull.

CONTRACTS AND ORDERS.

Walsall Council have given an order for an oxy-acetylene welding plant to G. Fairlie and Co.

Bournemouth Council have placed an order for spare parts for new cars with the British Westinghouse Company, at £431.

The Steel Company of Australia have received an order from Prahran and Malvern Tramways Trust for points and crossings.

Belliss and Morcom, Limited, of Birmingham, have received an order from Colchester Council for the supply of a 325 kw. steam dynamo (Vickers' dynamo), at £600.

Brush Electrical Engineering Company have received a contract from Batley Council for supplying a 1,200 kw. Ljungstrom turbo-generator. The British Westinghouse Company are to supply and erect one 500 kw. and one 250 kw. rotary converter to the same authority.

Mitchells, Ashworth, Stansfield and Company have received from the London and South Western Railway Company an order for 2,500 Mascolite pads for the electric power cables (in connection with the suburban lines electrification) to rest on in passing over bridges, viaducts, etc., to prevent damage to the cables by vibration.

Leeds Council have allotted contracts as follow:—For track work, D. Speight and Sons; extension of main switches at electricity works, British Westinghouse Manufacturing Company, Limited, £2,367; two-phase to three-phase switchgear at the electricity works, British Thomson-Houston Company, Limited, £2,985; economiser, E. Green and Son, Limited, £1,350.

Manchester Corporation have approved of the placing by the Tramways Committee of the appended contracts:—Smith and Forrest, pitch; Robert Carlyle, general builders' work, extension of Hyde Road car shed; E. Wood and Co., Limited, constructional steel and iron work, Hyde Road car shed extension; Brush Electrical Engineering Company, Limited, tramcar trucks; British Westinghouse Company, Limited, tramcar motors; Dick, Kerr and Co., Limited, tramcar controllers.

Tires for Halifax Omnibuses.—The Council have accepted the offer of Liga Tyres, Limited, of London, to supply tires for motor 'buses on a mileage basis at the price of three-farthings per mile per vehicle for a period of two years from January 1. In reply to a question, Mr. A. Fawcett, vice-chairman of the Tramways Committee, replied that the chairman and himself met five of the contractors, the biggest makers of tires in the country, and also got them to reduce their prices considerably. The committee were perfectly satisfied with these tires, although they were from a German company, and they would save the committee £62 on the two years.

London County Council have accepted the following tenders:—Frodingham Iron and Steel Company, 500 tons of slot rails and 1,000 tons of conductor rails, £13,150; Bolckow, Vaughan and Company, 6,300 tons of track rails and fastenings, of carbon steel, £30,796 5s.; Millar's Timber and Trading Company, 512,000 Jarrah wood paving blocks, at prices ranging from £6 12s. 6d. to £12 13s. 6d. per thousand, according to size and place of delivery; W. W. Howard, Brothers and Company, 321 000 creosoted deal paving blocks, at prices varying from £7 15s. to £8 18s. per thousand; Acme Flooring and Paving Company, 330,000 creosoted deal paving blocks, at prices from £8 13s. 6d. to £9 10s. per thousand.

PERSONAL.

Mr. R. Lomax, electrical engineer to Stockport Council, has had his salary raised to £600 from £500.

Mr. J. W. Dugdale, general manager and engineer, Oldham Corporation tramways, has been voted an increase of £50 per annum in his salary.

Mr. H. Holliday, engineer and manager of Torquay Tramways Company, has accepted the position of engineer and manager to the Rhondda Tramways Company. It is reported that Mr. Holliday's successor at Torquay will probably be Mr. Nesbit, at present engineer and manager to the Rhondda Company.

Sir Edward White, chairman of the Highways Committee of the London County Council, who has been absent for many months through serious illness, is now able to return to his duties, and he was present at the meeting of the Council on Tuesday last. He was cheered on entering, and the chairman expressed the congratulations of the Council.

Mr. David James, the general manager of the lessees of the Swansea and Mumbles Railway, was referred to by Lord Glantawe, the chairman of the company, at the annual meeting. His lordship stated that the company were under a great obligation to Mr. James for the harmonious relations existing between the two companies. Their interests were identical, and they appreciated Mr. James's ability and energy in the management of the railway.

Mr. Sydney Buxton, who since 1910 has been President of the Board of Trade, has been appointed Governor-General of South Africa, in succession to Lord Gladstone. Mr. Buxton, who will be succeeded by Mr. John Burns, the President of the Local Government Board, will be remembered for the persistent effort which he made, in the face of opposition, to render the Light Railways Amending Act of greater service to promoters than was the case with its predecessor.

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Mr. A. H. Stanley, managing director of the various underground railways known as the London Electric Railway, and of the London General Omnibus Company, on February 10 was presented with a silver cigar box by the staff of all departments of the London Electric Railways and power house as a mark of appreciation of his personal interest and efforts in obtaining for them interchange privilege tickets on all railways. Mr. C. J. Yorke, divisional inspector, made the presentation, and was accompanied on the platform by Mr. P. J. Thomas (superintendent) and Mr. A. H. Cooper (engineer) and Mr. S. J. Webb (passenger agent). In reply, Mr. Stanley gave some interesting reminiscences of his early days in "a little western town in North America," where he made up his mind to know all there was to know about railways. The London Electric Railways undertakings came into contact with 4,000,000 people daily, and unless the directors had had the hearty co-operation of every man on the staff it would have been impossible to accomplish as much as they had done. There were many problems facing them. One was how to secure sufficient money to carry on the great enterprises for which they were responsible. The other was the labour problem, for labour was asking more and more for the service it rendered.

FINANCIAL REPORTS AND MEETINGS.

Lancashire Tramways Company.—The paragraph inadvertently printed under this heading in last week's issue related to the Lanarkshire tramways, whose annual meeting is referred to below.

Lanarkshire Tramways.—At the annual meeting of this company the chairman stated that the capital expenditure had been heavy, amounting to about £11,000, mainly expended on 12 additional tramway cars and two motor omnibuses. There was a further expenditure of £2,000 on the extension of the car sheds, but this work was not completed when the accounts were made up at December 31 last. The traffic receipts showed an increase for the first half of the year of £6,314 and for the second half an increase of £6,303—a total of £12,707. The balance of profit available allows for payment of a dividend of 6½ per cent. per annum for the half-year, making 6¼ per cent. for the full year, as compared with 5⅜ per cent. for 1912, and after reserving £522 for additional remuneration due to the directors there is £1,991 to carry forward.

London General Omnibus Company.—As recorded in our last week's issue the total dividend proposed on the ordinary shares for the past year is 18 per cent. The gross receipts were £3,258,197 and expenditure £2,769,826. Depreciation of leases, plant, and machinery and reserve for renewals and contingencies took £191,614, leaving balance at credit of revenue account £206,757. The balance from the last account was £11,061, and interest and dividend on investments, etc., realised £38 911, making, in all, £346,729.

The British Electrical Federation.—The traffic statement for the week ended February 6, 1914, shows that the receipts from tramways and railways amounted to £38,943, as compared with £36,438 in the corresponding week last year, and from omnibuses £12,525, as compared with £1,664, making a total of £51,468, as compared with £38,102. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year the receipts show an increase of £2,318 upon the week.

Mumbles Railway and Pier.—The directors of the Mumbles Railway and Pier Company in the report for the half-year ending December 31, 1913, state that after payment of the dividends due to the Swansea and Mumbles Railway, Limited, under the agreement dated April 18, 1898, the net revenue account shows a balance available for dividends of £2,926 16s. 7d., and the directors recommend the payment of dividends at the rate of 4 per cent. per annum on £24,900 preference shares and 7 per cent. per annum on £47,183 ordinary shares for the half-year ending December 31, 1913, and to carry forward the balance of £992 16s. 1d. to the next account. Lord Glantawe, the chairman, presiding at the annual meeting on February 7, announced that in future only yearly meetings would be held, and that the directors would have power to declare interim dividends in the middle of the year. The line had been kept in very good order by the lessees, and everything was up to the mark.

Bristol Tramways and Carriage Company.—The report for 1913 recommends a final dividend at the rate of 5 per cent. per annum, making 4½ per cent. for the year, and £8,361 is placed to reserve fund for contingencies and renewals. A Bill is being promoted to empower the Corporation of Bristol to work any tramways purchased or belonging to them. There are no tramways belonging to the Corporation, neither have they as yet been able to decide whether or not to purchase any tramways. The directors point out that the Bill is, in fact, premature, and without precedent, and will receive their determined opposition. A comparison of the figures is given below :—

	1912.	1913.	Increase.
Tramway receipts	£230,539	£243,686	£13,147
Carriage receipts	133,745	174,701	40,056
Net revenue	68,202	80,233	12,031
Reserve fund	241,289	247,564	6,275

The receipts from the tramways showed an increase of £13,147, or 5⅜ per cent., and those of the carriage department increased £40,056, or 30½ per cent. There are 17 distinct tramway services, and 15 motor omnibus services, and the latter will be further increased in the ensuing summer. A large additional number of pleasure chars-a-banc are being constructed, as this branch of the business is rapidly developing.

Swansea and Mumbles Railway.—The directors' report for the year ended December 31 last states that the following interim dividends have been paid, viz. :—4½ per cent. per annum on £75,500 preference shares and 8⅜ per cent. per annum on £40,000 ordinary shares for the half-year ended June 30, 1913. The directors now recommend the payment at the rate of 4½ per cent. per annum on £75,500 preference shares and 8⅜ per cent. per annum on the reduced capital of £40,000 ordinary shares for the half-year ended December 31, 1913, which is equal to 7 per cent. per annum on the original capital. At the ordinary meeting on February 7, Lord Glantawe presided and moved the adoption of the report, and announced that next year the dividend would be half per cent. more than this year. They and the lessees were working very harmoniously together, and he was glad to note that the lessees were beginning to get some return for their expenditure and courage in the undertaking. Mr. Morgan B. Williams was re-elected to the directorate.

WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended February 7 amounted to £223,537, or £11,299 more than in the corresponding week last year, while the track mileage was 2,862, or 80 more than for the corresponding week. The receipts were at the rate of £78 2s. 1d. per track mile, an increase of £1 15s. 9d. per mile as compared with last year.

(Continued from page 152.)

EAST HAM CORPORATION.

TO MOTOR FIRE ENGINE MAKERS.

The East Ham Corporation invite tenders for the supply and delivery of a Petrol-Driven Motor Fire Engine and Motor Fire Escape.

Particulars and form of tender may be obtained on application to Mr. J. Birch, Borough Engineer, Town Hall, East Ham, E.

Tenders to be sent in, addressed to "The Worshipful the Mayor, Town Hall, East Ham, E.," endorsed "Tender for Motor Fire Engine," not later than 12 o'clock noon of Monday, February 23, 1914.

The firm whose tender is accepted will be required to observe and fulfil the obligations upon contractors specified in the Fair Wages Resolution adopted by the House of Commons on the 10th March, 1909, which is fully set forth in the specification and particulars of tender, and to enter into a contract with a bond for the due performance thereof.

The Corporation does not bind itself to accept the lowest or any tender.

By order, C. Eustace Wilson.
Town Clerk.

Town Hall, East Ham, E.,
February 11, 1914.

BOROUGH OF WIMBLEDON.

MOTOR TENDER FOR FIRE BRIGADE DEPARTMENT.

The Corporation of Wimbledon invite tenders for the supply of a Motor Tender. Specification and conditions of tender may be obtained from the undersigned.

Sealed tenders, addressed to the Chairman of the Watch Committee, and endorsed "Motor Tender," must be sent to or delivered at my office not later than 12 o'clock noon on Wednesday, February 25, 1914.

A. Steele Sheldon,
Town Clerk.

Town Clerk's Office, Wimbledon.

BOROUGH OF SWINDON.

ELECTRICITY AND TRAMWAYS DEPARTMENTS.

The Corporation of Swindon invite tenders for the supply of the undermentioned Materials during the twelve months ending March 31, 1915 :—

12. General Stores for Electricity and Tramways Departments, Fuse and Service Boxes, etc.
13. Direct Current Meters.
14. Lubricating Oils and Grease.

Specifications, forms of tender, and all requisite information may be obtained on application to the Tramway Manager, Mr. T. Medcalf, Corporation Street, Swindon.

Samples of goods to be supplied may be inspected at the Electricity Works.

Tenders, on the prescribed forms, and endorsed "Tender for ————," and accompanied, where necessary, with samples, to be delivered to the undersigned by 12 o'clock at noon, on Saturday, the 7th day of March, 1914.

The Corporation do not bind themselves to accept the lowest or any tender.

Robt. Hilton,
Town Clerk.

Town Hall, Swindon,
February 9, 1914.

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BOROUGH OF SWINDON.

ELECTRICITY AND TRAMWAYS DEPARTMENTS.

TRAMWAY TICKETS AND TICKET PUNCHES.

The Corporation of Swindon invite tenders for the supply of Tramway Tickets and Ticket Punches during the three years ending March 31, 1917.

Copies of the specification, general conditions, and form of tender may be obtained on application to the Tramway Manager, Mr. T. Medcalf, Electricity Works, Swindon.

Sealed tenders, properly endorsed, to reach the undersigned not later than 12 o'clock noon on Wednesday, February 25 instant.

ROBT. HILTON,
Town Clerk.

Town Hall, Swindon,
February 9, 1914.

ROYAL BURGH OF KIRKCALDY.

ELECTRIC LIGHTING AND TRAMWAYS DEPARTMENT.

The Corporation of Kirkcaldy invite tenders for 4 Double-Deck Tramcars complete, to run on the Corporation Tramways.

Form of tender, with specification and general conditions, can be obtained from O. F. Francis, M.I.E.E., Burgh Electrical Engineer and Tramways Manager, Electricity Works, Kirkcaldy, on and after 16th curt.

Tenders, in sealed envelopes, endorsed "Tramcars," should be delivered to the undersigned not later than Monday, March 2, 1914.

The Corporation does not bind itself to accept the lowest or any tender.

W. L. MACINDOE,
Town Clerk, Kirkcaldy.

COUNTY BOROUGH OF SOUTHAMPTON.

STORES AND FITTINGS.

The Corporation invite tenders for the supply of the following Stores and Fittings required in the Tramways and Electricity Departments during a period of twelve months, according to specification and conditions to be obtained upon application to Mr. Leonard Johnston, General Manager, Tramway Offices, 161, Above Bar Street, Southampton :—

1. Screws.
2. Files.
3. Iron and Steel.
4. Bolts and Nuts.
5. Nails and Panel Pins.
6. Castings.
7. Glass.
8. White Lead, Turpentine, etc.
9. Vaseline, Paraffin, etc.
10. Cotton Waste, Rope, etc.
11. Brooms.
12. Leathers, Dusters, etc.
13. Tools.
14. Timber.
15. Cement.
16. Motor Grease.
17. Transfer Gold.
18. Dies.
19. Hack Saw Blades.
20. Drills, Twist Bits, etc.
21. Bricks.

Tenders upon the printed form, endorsed "Tenders for Stores, etc., Tramways and Electricity Departments," must be delivered at the Town Clerk's Office on or before Saturday, February 21, 1914.

No pledge is given to accept the lowest or any tender or tenders, and no tender form will be sent out unless applied for.

R. R. LIXTHORNE,
Town Clerk.

Town Clerk's Office,
Municipal Offices, Southampton,
February 9, 1914.

DICK, KERR & CO.,

Limited,

ABCHURCH YARD, CANNON STREET, LONDON, E.C.

ENGINEERS & CONTRACTORS.

Complete Equipment

TRAMWAYS & LIGHT RAILWAYS

at home and abroad.

PLYMOUTH CORPORATION TRAMWAYS.

Tenders are invited for the supply of Tickets for use on the Corporation Tramway System.

Full particulars and specification and general conditions, together with form of tender, can be obtained on application to the undersigned.

Tenders, endorsed "Tramway Tickets," must be received at my office on or before March 19 next.

The Corporation does not bind itself to accept the lowest or any tender.

J. H. ELLIS,
Town Clerk.

Municipal Buildings, Plymouth,
February 10, 1914.

PLYMOUTH CORPORATION TRAMWAYS.

TICKET PUNCHES.

Tenders are invited alternatively for the Purchase or Hire of Ticket Registering Punches for use upon the Corporation Tramway System.

Full particulars and conditions, together with form of tender, can be obtained upon application to the undersigned.

Tenders, endorsed "Tramway Punches," must be received at my office on or before March 19 next.

The Corporation does not bind itself to accept the lowest or any tender.

J. H. ELLIS,
Town Clerk.

Municipal Buildings, Plymouth,
February 10, 1914.

POSITION VACANT.

MECHANICAL DRAUGHTSMAN.

Wanted at once, Mechanical Draughtsman, one having experience in Tramway Tracks. Address, stating salary wanted, Anger Manufacturing and Supply Company, Bank Chambers, Preston, Lancs.

COPPER AND ALUMINIUM MARKET.

February 13, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

	Friday, February 13.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	55 12 6	65 2 6	65 10 0
,, ,, (three months) ..	60 2 6	65 10 0	65 15 0
Electrolytic Copper—bars or ingots ..	68 5 0	68 0 0	74 0 0
Aluminium—bars or ingots	83 0 0	83 0 0	90 0 0

COAL MARKET.

February 13, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

	Friday, February 13.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	s. d.
Best Admiralty Welsh (large)	23 6	23 6	23 6	23 9
Best Seconds	23 3	23 0	23 0	22 9
Ordinary Drys	21 9	21 6	22 0	22 0
Best Washed Nuts	21 0	21 0	21 6	21 6
Best Washed Peas	19 6	19 6	20 0	18 9
Cardiff, f.o.b.—				
Best Admiralty (large) ..	19 0	19 0	18 0	18 9
Best Seconds	18 9	18 6	18 0	17 9
Ordinary Drys	17 3	17 0	17 0	17 0
Best Washed Nuts	16 6	16 6	16 6	16 6
Best Washed Peas	15 0	15 0	15 0	13 9
Newcastle, f.o.b.—				
Best Steams	14 6	14 6	14 6	15 0
Best Seconds	12 0	12 3	14 0	13 6
Smalls	6 9	6 9	10 6	11 0

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1913-3.	Latest Return. 1913-4.	Aggregate. Wks.	Aggregate. 1913-4.	Aggregate. Increase or Dec.
Anglo-Argentine	Feb. 4	£53,204	£56,665	5	£284,576	+ £12,202
Auckland..... (28 days)	Jan. 16	21,653	25,633	29	135,538	— 3,874
Ballarat and Bendigo	Dec.	3,863	3,850	38	34,575	— 724
Brazilian St. Rly. Mlrs.	Dec.	47,512	57,250	22	264,464	+ 45,611
Brazilian Traction.....	Feb. 7	94,955	95,500	6	565,459	+ 44,418
Brisbane	Jan.	24,810	28,330	4	28,330	+ 3,520
British Columbia ....$	Dec.	773,741	798,219	26	4,553,726	+ 302 902
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacroze .	Jan.	44,601	48 651	30	316,546	+ 8,887
Calcutta.....Rs.	Feb. 7	63 690	67,046	6	4,12,418	+ 13,190
Cape Town	Dec.	...	14,925	...	...	...
Carthagena & Herrerias	Jan.	3,324	2,776	4	2,776	— 548
Cordoba	Dec.	12,266	12,863	39	120,318	+ 11,081
East India	Jan.	1,850	1,988	26	11,817	+ 437
Kalgoorlie.....	Dec.	3,206	2,907	52	34,510	— 8,300
La Plata.....	Jan.	5,575	5,296	4	5,296	— 279
Lima.....	Sept.	24,660	34,110	39	300,647	+ 23,783
Lisbon ..... Mlrs.	Sept.	...	144,538	...	...	...
Madras (14 days) Rs.	Jan. 31	26,530	28,836	4	58,139	+ 5,019
Melbourne	Dec.	...	69,000	...	...	...
Mexico .....$	Dec.	653,102	611,673	52	6,813,046	+ 136,482
Montevideo.....	Jan.	38,081	38,256	18	102,095	— 72
Para	Feb. 8	4,469	3,709	10	38.713	— 6,984
Port Elizabeth.....	Dec.	...	4,967	...	...	...
Shanghai .....$	Feb. 4	22,748	25,000	5	122,000	+ 22,995
Singapore .....$	Feb. 7	13,468	12,449	6	70,569	+ 3,981
Toronto .....$	Nov.	742,156	849,279	48	8,893,984	+1,176,680
Winnipeg.....$	Dec.	361,700	379,863	52	4,078,694	+ 313,310

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1913-4.	Increase or Dec.
Aberdeen Corporation..	Feb. 4	£1,423	£1,458	+ £32	36	£58 205	+ £3.213
Accrington Corp.	,, 4	523	545	+ 22	44	25,407	+ 2,222
Ayr Corporation	,, 7	202	241	+ 39	38	14,607	+ 2,077
Bath Electric	,, 4	669	727	+ 58	5	3,398	— 171
Birkenhead Corp.	,, 8	1,150	1,233	+ 83	45	58,138	+ 5.270
Birmingham Corp.	,, 7	11,455	12,287	+ 832	45	534,565	+ 44,304
Blackburn Corporation	,, 4	1,064	1,157	+ 93	45	58,635	+ 5.035
Blackpool Corporation	,, 5	649	735	+ 86	44	79,637	+ 12.352
Bolton Corporation	,, 8	2,503	2,577	+ 74	45	123,183	+ 6,861
Bournemouth Corp.	,, 11	1,573	1 563	— 10	45	93,083	+ 9,375
Bradford Corporation...	,, 7	5.338	5,854	+ 516	44	265,168	+ 15,664
Brighton Corporation...	,, 8	771	796	+ 25	45	48,675	+ 2.853
Bristol	,, 6	6,944	7,543	+ 599	5½	38,734	+ 1,278
British Elec. Federatn.	,, 6	38,102	51,468	*	...	...	...
Burnley Corporation	,, 7	1,523	1,621	+ 93	45	76,449	+ 7,987
Burton-on-Trent Corp.	,, 8	265	280	+ 15	45	13,281	+ 644
Bury Corporation	,, 8	1,248	1,287	+ 39	45	60,553	+ 2.255
Cardiff Corporation	Jan. 10	2,476	2,580	+ 104	41	112.415	+ 11,278
Chatham and District..	Feb. 5	821	836	+ 15	5	4,042	— 378
Chesterfield Corp.	,, 5	236	258	+ 22	44	11,552	+ 1,262
Colne & Trawden	,, 7	233	238	+ 5	6	1,376	+ 40
Cork Electric	,, 5	428	445	+ 17	5	2 221	— 84
Croydon Corporation ...	Jan. 30	1,464	1,387	— 77	43	71,697	— 6,451
Darlington Corporation	Feb. 7	236	243	+ 7	45	11 214	+ 1 008
Derby Corporation	,, 7	903	951	+ 48	45	44,066	+ 3,913
Dover Corporation	,, 7	195	195	Nil	45	10,957	+ 69
Dublin & Lucan	,, 6	108	122	+ 14	5	589	— 24
Dublin United	,, 6	5,504	5,336	— 168	6	26,982	— 2,301
Dundee City	,, 4	1,195	1,244	+ 49	38	49,872	+ 3.425
East Ham Corporation	,, 7	1,069	1,046	— 23	45	46,485	— 2,175
Exeter Corporation	,, 6	276	306	+ 30	45	15,279	+ 650
Gearless Mo'or 'Buses.	,, 6	...	462	...	6	2 455	...
Glasgow Corporation	,, 7	19.183	20,871	+ 1,688	36	733 9 8	+ 52,181
Glossop(U.Elec.Supply)	,, 7	124	118	— 6	6	711	— 17
Halifax Corporation ...	,, 3	1,787	1,913	+ 126	44	93,107	+ 3,359
Hastings & District	,, 4	652	711	+ 59	5	3,294	— 242
Huddersfield Corp.	,, 7	1,983	2,091	+ 108	45	95,650	+ 4,766
Hull Corporation	,, 7	3,035	3,290	+ 255	45	142,488	+ 7.283
Ilford U.D.C.	,, 7	414	432	+ 18	44	20,193	— 965
Ilkeston Corporation ...	,, 11	114	120	+ 6	46	6,053	+ 856
Ipswich Corporation ...	,, 7	355	367	+ 12	45	20,433	+ 653
Isle of Thanet	,, 7	284	300	+ 16	19	6,401	+ 462
Kilmarnock Corp.	,, 7	157	167	+ 10	38	6.744	+ 433
Lanarkshire	,, 5	1 423	1,763	+ 340	5	9,365	+ 945
Lancashire United	,, 4	1.323	1,532	+ 209	5	7,655	+ 1.026
Leeds City	,, 7	7,785	8,107	+ 322	44	363,904	+ 14,551
Leicester Corporation...	,, 7	2,735	2,832	+ 97	6	14,936	+ 650
Leith Corporation	,, 7	635	666	+ 31	38	27,152	+ 1,244
Leyton U.D.C.	Jan. 22	1,192	1,233	+ 41	42½	57,107	— 190
Liverpool Corporation..	Feb. 9	12,172	12,777	+ 545	5	68,905	+ 2,762
Llandudno & Colwyn B.	,, 6	143	153	+ 11	10	1 461	— 3
London County Council	,, 4	40,917	41,985	+ 1,068	43	1,839,677	+ 6.342
London Gnl. Omnibus..	,, 7	55,526	57,976	+ 2,450	6	320,719	— 5,515
London United	,, 6	5,189	5,559	+ 370	6	27,804	— 300
Lowestoft Corporation	,, 7	137	179	+ 42	18	3,441	+ 279
Maidstone Corporation	,, 5	157	171	+ 14	45	9,107	+ 595
Manchester Corp.	,, 7	16.338	17.005	+ 707	45	787,997	+ 33,807
Met. Elec. Trys.	,, 6	8,196	8,541	+ 345	6	43,488	— 864
Nelson Corporation	,, 7	174	180	+ 6	45	9.369	+ 755
N'castle-on-Tyne Corp.	,, 7	4,696	5,200	+ 504	45	221,379	+ 21,044
Newport (Mon.) Corp.	,, 7	748	746	— 2	45	34.560	+ 2.376
New St. Helens & Dist...	,, 4	704	748	+ 44	32	26,019	+ 2.371
Northampton Corp	,, 6	530	571	+ 41	45	25,776	+ 1,491
Nottingham Corp.	,, 5	3,157	3,264	+ 107	44½	148,988	+ 6,330
Oldham Corporation ...	,, 8	2,019	2.179	+ 160	46	101,392	+ 7,019
Portsmouth Corp.	,, 7	1,795	1,920	+ 125	45	101,407	+ 6,457
Preston Corporation ...	,, 4	791	813	+ 22	45	39.682	+ 2,368
Provincial	,, 7	1,584	1,669	+ 85	18	31,986	+ 1,783
Reading Corporation ...	,, 5	640	651	+ 11	44	31,064	+ 2,155
Rochdale Corporation	,, 7	1,424	1,488	+ 64	45	71,842	+ 2.919
Rotherham Corp.	,, 11	883	1 063	+ 180	45	45,946	+ 9,586
Salford Corporation ...	,, 9	4,849	5,016	+ 157	45	235,311	+ 10 573
Sheffield Corporation ...	,, 8	7,519	7,670	+ 151	46	337,640	+ 24,588
Southampton Corp.	,, 4	1,151	1,178	+ 27	44	58,454	+ 3,655
Southend-on-Sea Corp.	,, 4	538	668	+ 130	45	41,823	+ 7,113
South Met. Trys.	,, 6	695	1,048	+ 353	6	5,125	+ 1,359
South Shields Corp.	,, 7	627	701	+ 74	45	32,375	+ 3.691
Sunderland Corp.	,, 8	1,371	1,312	— 29	45	65,053	+ 5 896
Sunderland District ...	,, 4	519	577	+ 58	14	7.938	+ 893
Swindon Corporation ...	,, 4	147	144	— 3	44	7,349	+ 383
Trys. (M.E.T.) 'Buses	,, 6	...	8,569	...	6	43.625	...
TynesideTrys.&Tmrds	,, 4	433	433	+ 30	5	2.265	+ 103
Wallasey Corporation	,, 7	1 000	1.09	+ 91	45	54 546	+ 4,893
Walsall Corporation	,, 7	618	617	— 1	6	3 281	— 45
Walthamstow U.D.C....	,, 7	644	707	+ 63	45	33,426	+ 1,298
Warrington Corp	,, 1	469	463	— 6	40	17,732	+ 478
West Ham Corporation	,, 5	2,577	2 648	+ 71	44	121,048	+ 3.612
Wigan Corporation	,, 5	1,394	1.504	+ 110	44½	66,463	+ 6,063
Wolverhampton Corp	,, 11	1,008	1,039	+ 31	46	49,371	+ 2,410
Yorkshire (W. Riding)	,, 8	1,595	1,632	+ 37	6	8,509	+ 603

* From such of the services as were working both last year and this year the receipts show an increase of £2,318 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London	Feb. 7	£5,206	£4,921	— £285	6	£31,268	— £1,998
City and South London	,, 7	2,893	2,674	— 219	6	17.306	— 1,187
Liverpool Overhead	,, 8	1,594	1,613	+ 19	6	10.021	+ 339
London Electric	,, 7	14,155	14,105	— 50	6	88.295	— 720
Mersey	,, 8	2.363	2,300	+ 37	6	13.629	+ 47
Metropolitan	,, 7	15,792	17.334	+ 1,542	6	108.487	+ 9,026
Metropolitan District..	,, 7	13,016	12.984	— 32	6	78 933	— 803

The Tramway & Railway World can be obtained, post free, at the following rates:—

For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.

For places abroad—Thirty Shillings per annum.

Tel. No.: **2948** Gerrard.
Telegraphic Address: **"Tramigio," London.**

AMBERLEY HOUSE, NORFOLK ST., W.C.

TRAMWAY AND OMNIBUS SHARE LIST.

Paid-		On Week	Quotations, February 13.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	70 — 73
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	...	4⅞ — 5⅛
5	Do. 5½% Cum. 2nd Pref.	...	4⅜ — 4⅝
100	Do. 4% Deb. Stk. Red.	+ 1½	93 — 96
100	Do. 4½% Deb. Stk. Red.	...	96½ — 99½
100	Do. 5% Deb. Stk. Red.	...	96½ — 98½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 —106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅞ — ⅝
1	Do. 5% Cum. Pref	...	⅝ — ¾
100	Do. 4½% 1st. Mort. Deb. Stock, Red.	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	— ½	85 — 87
10	Blackpool and Fleetwood Tramroad Co.	+ 1¼	14½ — 15½
	Bombay Elec. Supply and Trams. Co., Ord.	+ 1	14½ — 15½
10	Do. do. 6% Cum. Pref.	...	10¾ — 11¾
100	Do. do. 4½% Db. Stk Rd.	...	94½ — 96½
$100	Brazilian Traction Light and Power Co. Ltd.	+ 1	92 — 94
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	...	7⅝ — 8¼
5	Do. do. 5% Cum. Pref	...	4⅞ — 5⅜
100	Do. do. 4½% 1st Deb Stock, Red.	...	97 —100
10	Bristol Tramways and Carriage Co.	+ 1⅛	6¼ — 7
10	Do. do. 4% Cum. Pref.	+ ⅛	7 — 7¼
100	Do. do. 4% Deb. Stock	...	100 —102
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	+ 1	121 —125
100	Do. Pref. Ord. Stock	...	107 —111
100	Do. 5% Cum. Perpetual Pref. Stock.	+ 1	103⅛ —106⅛
100	Do. 4½% 1st Mort. Debs.	...	98 —101
40	Do. 4½% Vancouver Power Debs.	...	94 — 98
100	Do. 4½% Perpetual Cons. Deb. Stk.	...	95 — 98
100	British Elec. Traction Co., Lim., 6% Cum. Pref.	— ½	90 — 93
10(	Do. 7% Non-Cum. Pref.	— 1	57 — 60
10	Do. 6% Pref. Ord. Non-Cum.	+ ⅛	16⅛ - 18⅛
100	Do. Deferred Ord. Stock	...	7⅛ — 9⅛
10(	Do. 5% Perpetual Debenture Stock.	...	93 — 96
100	Do. 4½% Second Debenture Stock, Red	+ 1	80 — 83
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	73 — 78
100	Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb.	— 1⅛	99 —101 xd
5	Calcutta Tramways Co., Limited. Ord.	...	6 — 6¼
5	Do do. 5% Cum. Pref.	...	5 — 5¾
100	Do. do. 4½% 1st Deb. Stock, Red.	...	96 — 99
1	Cape Electric Tramways, Ld.,	...	⅝ — ¾
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	3 — 3¾
100	Do. 5% Debs. Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co. (1904), Lim.	...	5⅛ — 5⅜
100	Do. 4% Debenture Stock Red, 1935	...	91 — 96
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.	...	89 — 93
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	— ½	95 — 97
10	Cork Electric Tramways and Lighting Co. 6% Cum. Pref.	...	— 6⅞
10	Dublin United Trams. Co. (1896) Lim. Ord.	...	— 11
10	Do. do. 6% Pref.	+ ⅛	— 12¾
100	Do. do. "A" Red.	...	— 80¼
100	Do. do. Deb. Stock "B" Red.	+ 2	— 79
10	Gateshead & Dist Trys. Co., Ord.	...	8¾ — 9¾
10/-	Hastings & Dist. Electric Trams. Co., Ld., Ord.	...	⅝ — ¾
1	Do. do. 6% Cum. Pref.	...	⅛ — ¼
100	Do. do 4½% Deb. Stk. Red.	+ 2	68 — 73
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	93¼ — 97¼
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)	...	86 — 90
10	Imperial Tramways, Ord.	— ¼	3 — 3½
10	Do. do. 6% Cum. Pref.	...	6¼ — 6¾
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.	...	2 — 2¼
100	Do. 4% Debenture Stock	...	71 — 76
1	Kalgoorlie Elec. Trams., Ltd.	...	0 — 1/16
100	Do. do. 5% "A" Deb. Stk.	...	85 — 90
10(	Do. do. 6% "B" do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.	...	⅛ — 1
10	Lanarkshire Tramways Co.	— ¼	9¾ — 10¾
100	Lancashire United Tramways, 5% Prior Lien Deb.	+ 2	83 — 85
1	Lisbon Electric Trams., Lim., Ord.	...	1½ — 1⅝
1	Do. 6% Cum. Pref.	...	⅛ — 1⅜
100	Do. 5% Mort. Debs.	...	91 — 96
1	London and Suburban Trac. Co., Lim., Ord.	...	¼ — ⅝
100	London General Omnibus Company, Limited, 4½% Deb.	+ ½	97½ — 99½
100	Do. Do. 5% Cum. Inc. Deb. Stk. Red.	— 2	90 — 93 xd
100	London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red	...	65 — 69
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref.	...	4⅞ — 5¼
5	Do. do. 5% Deb. Stk., Red.	...	101 —103
10(	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	79 — 82
$10(	Manila Electric R.R. and Lighting Corp. Capital Stk.	...	114¼ —117½
$1,000	Do. do. 5% Bds.	— 1½	97 — 99 xd
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	⅞ — 1
100	Metropolitan Elec. Trms. Ltd., 4½% Deb Stock, Red.	...	90 — 93
100	Do. 5% Deb. Stock, Red.	+ 1	90 — 93
100	Mexico Tramways Co., Common Stock	— 1½	72 — 76
500	Do. Gen. Con. 1st Mort. Gld. Bonds	— 3	80 — 85
100	Do. 6% 50-yr. Mort. Bonds	— 2	83 — 87
...	Michigan United Railways 5% 1st Mort. Gld. Bonds	...	91¼ — 93¼
10(	Montreal Street Railway, Sterling 4½% Debs. (1922)	...	98 —100
100	Do. 4½% Sterling Debs, (1922)	...	99 —101
1	National Steam Car Co. Ltd.	...	¾ — ⅞
10	Oldham—Ashton and Hyde Elec. Ord.	...	5⅞ — 6¼
10	Do. do. 5% Cum. Pref.	— ½	5⅝ — 5⅞
5	Para Elec. Rlys. and Ltg. Co., Ord.	— ⅛	4⅞ — 5¼
5	Do. do. 6% Cum. Pref.	...	4⅛ — 5
1	Perth (W.A.) Elec. Trams., Ld., Ord.	...	—
1	Potteries Electric Traction Co., Ltd., Ord.	...	¾ — ⅞
1	Do. 5% Cum. Pref.	— 1/32	37/32 — 39/32 xd
100	Do. 4½% Debenture Stock, Red.	...	84 — 87
1	Provincial Tramways, Lim., Ord.	...	33/32 — 35/32 xd
10	Do. 5% 1st Deb. Stock	...	95 — 98
...	Puebla Tramway, Light & Power Co., Prior Lien 5%..	— 1	80 — 84
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.	...	5 — 5½
100	Do. do. 4½% 1st Mt. Db. Stk	...	95 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	89 — 91
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	...	101 —103
100	Do. do. 5% 50-yr. Mort. Gold Bonds	— 1½	94 — 96
10(	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	...	100 —103
$50(	Do. 5% 1st Mort. Debs., Red., 1929	— 2	99 —102 xd
10	Shanghai Elec. Construction Co.	...	11¼ — 12¼
10(	Singapore Elec. Tramways Lim., 5% Debs. Red	...	87 — 91
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref.	...	⅜ — ¾
10(	Do. do. 4% Deb. Stk.	...	66 — 70
...	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	98 — 100
10(	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	98 —100
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	+ ½	82½ — 84½
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	93 — 95
5	United Elec. Tramways of Monte Video, Ord.	...	4⅝ — 5⅛
5	Do. do. 6% Cum. Pref.	...	4⅜ — 5¼
100	Do. do. 5% 1st Deb. Stk. Red.	...	94 — 97
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	95 — 97
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	⅞ — 1⅛
5	Do. do. 6% Cum. Pref.	...	3¾ — 4¼
100	Do. do. 4½% 1st Deb. Stock. Red.	...	80 — 85

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

URBAN DISTRICT COUNCIL OF BEXLEY.

The Urban District Council of Bexley invite tenders from manufacturers for the following machinery:—

Contract No. 84.—500 Kilowatt Turbo-Alternator with Exciter, Condensing Plant and Pipe Work.

Contract No. 85.—Water Tube Boiler and Superheater, together with Mechanical Stoker.

Copies of general conditions, specifications, and drawings may be obtained from the undersigned.

The sum of £1 must be deposited for each specification in the first instance, which will be returned on receipt of a *bonâ-fide* tender. Subsequent copies will be supplied at the rate of 5s. each.

Sealed tenders, endorsed with the contract number, to be delivered not later than noon on the 25th day of February, 1914, addressed to Thos. G. Baynes, Esq., Clerk to the Council, Council Offices, Broadway, Bexley Heath.

The Council does not bind itself to accept the lowest or any tender.

H. P. STOKES, A.M.I.E.E., A.M.I.Mech.E.,
Electrical Engineer and Tramways Manager.

Electricity and Tramways Offices,
Broadway, Bexley Heath.

COUNTY BOROUGH OF BELFAST.

TRAMWAY STORES.

The Tramways and Electricity Committee invite tenders for one or three years' supply of the undermentioned Materials:—

Tramcar Fittings.	Carbon Brushes.
Paints, etc.	Springs.
Oils and Grease.	Electrical Accessories.
Cotton Waste, etc.	Gold Leaf and Transfers.
Insulating Materials.	Hardware.
Canvas.	Trolley Heads.
Drysalteries.	Forgings.
Malleable Iron, Iron, Brass, and Gunmetal Castings.	Brake Chains.
	Plumbing Materials.

Forms of tender may be obtained on application to the Chief Engineer, Tramways Department, Napier Street, Sandy Row, Belfast, upon payment of 2s. 6d., which will be returned upon receipt of a *bonâ-fide* tender.

The Committee do not bind themselves to accept the lowest or any tender. The whole or any part of a tender sent in may be accepted, and tenders shall be open for acceptance until May 10 next.

This tender must be enclosed in an envelope, duly sealed, and addressed to the undersigned, endorsed "Tender for Stores—Tramways Department," and must be received in the City Hall, Belfast, not later than 11 o'clock a.m., on Monday, March 9, 1914.

A tender, if sent by post, must be registered; if delivered by hand, an official receipt must be obtained for it, otherwise the undersigned will not be responsible.

R. MEYER,
Town Clerk.

City Hall, Belfast,
February, 1914.

BELFAST CITY TRAMWAYS.

TRAMWAYS DEPARTMENT.

TENDERS FOR THE EXCLUSIVE RIGHT OF ADVERTISING UPON THE TRAMWAY CARS.

The Tramways and Electricity Committee are prepared to receive tenders for the exclusive right of Advertising upon the Tramway Cars, belonging to the Corporation Tramway Undertaking, for a term of Seven Years from July 1, 1914.

A form of tender, with conditions, may be obtained upon application to the General Manager, at the Tramway Office, Sandy Row, Belfast.

The number of cars at present owned by the Corporation is 289. But it is expected that the number will be increased to 300 by January 1, 1915, or soon after.

The Corporation do not bind themselves to accept the highest or any tender, or to defray any expenses in connection therewith.

Tenders, endorsed "Tender for Advertising—Tramways Department," must be enclosed in an envelope, duly sealed, and addressed to the undersigned. If sent by post it must be registered; if delivered by hand, an official receipt must be obtained for it; otherwise the undersigned will not be responsible. It must be received in the City Hall, Belfast, not later than 11 o'clock a.m. on Monday, March 9, 1914.

R. MEYER,
Town Clerk.

City Hall, Belfast,
February, 1914.

COMMONWEALTH OF AUSTRALIA.

The High Commissioner for the Commonwealth of Australia invites tenders for the supply of 10,000 tons of 80lb. Steel Rails, to be delivered ex-ship's slings on railway trucks at Port Augusta, South Australia.

Specifications, containing conditions of contract and forms of tender and drawings, may be obtained by *bonâ-fide* tenderers on payment of one guinea for the specification and 5s. for the drawings, at the Office of the Consulting Engineers, John Coates and Co., Limited, 115, Victoria Street, Westminster, S.W. Tenders to be delivered to the Office of the High Commissioner, 72, Victoria Street, Westminster, S.W., not later than 11 a.m. on Wednesday, March 4, 1914, marked "Tender for Steel Rails."

The High Commissioner does not bind himself to accept the lowest or any tender.

COUNTY BOROUGH OF SOUTHAMPTON.

TO CONTRACTORS AND OTHERS.

The Corporation invite tenders for the supply and delivery of:—

(*a*) Rotary Converter
(*b*) Balancer
(*c*) Direct Current Meters

to the Electricity Supply Station, Western Esplanade, Southampton.

Specifications and conditions, with forms of tender, may be obtained upon application to the Borough Electrical Engineer.

Sealed tenders, suitably endorsed, must be delivered at the Town Clerk's Office, by 10 a.m., on the 9th proximo.

No pledge is given to accept the lowest or any tender.

R. R. LINTHORNE,
Town Clerk.

Town Clerk's Office,
Municipal Offices, Southampton,
February 17, 1914.

COUNTY BOROUGH OF BLACKBURN.

TRAMWAYS DEPARTMENT.

Tenders are invited for the supply of Iron, Steel, Bolts, Nuts, etc.

List may be had on application to the undersigned.

J. H. COWELL,
General Manager.

Tramway Office, Blackburn.

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GREAT NORTHERN RAILWAY COMPANY (IRELAND).

TO MANUFACTURERS OF SWITCHES AND CROSSINGS.

The Directors are prepared to receive tenders for the supply of Switches and Built Crossings and Chairs for same.

Copies of the drawings and specification may be obtained from the undersigned on payment of two guineas, which will be refunded on receipt of a *bonâ fide* tender and the return of the drawings.

Tenders, made out on the forms supplied by the Company, should be delivered under sealed cover, endorsed "Tender for Switches and Crossings," to the undersigned not later than 10 a.m. on Monday, March 9, 1914.

The Directors do not bind themselves to accept the lowest or any tender.

T. MORRISON,
Secretary.

Secretary's Office,
Amiens Street Terminus, Dublin.
February 18, 1914.

PLYMOUTH CORPORATION TRAMWAYS.

Tenders are invited for the supply of Tickets for use on the Corporation Tramway System.

Full particulars and specification and general conditions, together with form of tender, can be obtained on application to the undersigned.

Tenders, endorsed "Tramway Tickets," must be received at my office on or before March 19 next.

The Corporation does not bind itself to accept the lowest or any tender.

J. H. ELLIS,
Town Clerk.

Municipal Buildings, Plymouth,
February 10, 1914.

PLYMOUTH CORPORATION TRAMWAYS.

TICKET PUNCHES.

Tenders are invited alternatively for the Purchase or Hire of Ticket Registering Punches for use upon the Corporation Tramway System.

Full particulars and conditions, together with form of tender, can be obtained upon application to the undersigned.

Tenders, endorsed "Tramway Punches," must be received at my office on or before March 19 next.

The Corporation does not bind itself to accept the lowest or any tender.

J. H. ELLIS,
Town Clerk.

Municipal Buildings, Plymouth,
February 10, 1914.

(Continued on page 164.)

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers,
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." Telephone: 3488 Leeds.
OVERHEAD LINE MATERIAL AND SUPPLIES.

Pole Paints &RC
As supplied to important Companies at home & abroad. Durable, ready-mixed, permanent colours that defy rust and exposure. Samples & Prices on request.
Robert KEARSLEY & Co., Ltd.
RIPON, England

MILLARS' TIMBER AND TRADING CO., LTD.
PINNERS' HALL, GREAT WINCHESTER STREET, LONDON, E.C.
SUPPLY
JARRAH
THE SANITARY WOOD PAVING
REGISTERED TRADE MARK M.J.
Telegrams: "JARRAH, LONDON."
Telephone: 368 LONDON WALL.

SIMPLEX CONDUITS, Ltd.
GARRISON LANE, BIRMINGHAM.
Makers of Simplex Steel Conduit System and
WIRES and CABLES.
BITUMEN CABLES.
TRAMCAR HEATERS.
TRAMCAR METERS.
MEASURING INSTRUMENTS.
WATERTIGHT FITTINGS FOR CAR SHEDS.
ENCLOSED (Indicating) FUSES (to N.E. Code or English Standard).
500 page Catalogue sent free on request.

FOR
SPECIAL
CAR VARNISH
SEND TO
PINCHIN JOHNSON & CO., Ltd.,
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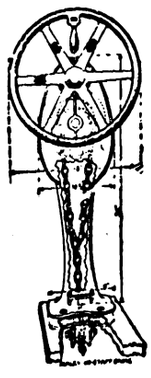

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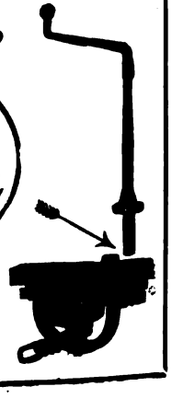

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THE
Tramway AND Railway World

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SATURDAY, FEBRUARY 21, 1914.

THE "OCEAN"

ACCIDENT AND GUARANTEE CORPORATION, LTD.,

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PREMIER INSURER OF TRAMWAYS.

HEAD OFFICE:

MOORGATE STREET, LONDON, E.C.

CONDUCTORS AND COMPETITION.

The efficiency with which conductors carry out their duties in the face of competition is about to become a matter of greater importance to provincial tramway undertakings. As reported in the Motor Traffic Section in the issue of this journal of January 15 there are several systems, municipal and company, that are being partially worked over by outside omnibus companies. It is true that the latter have undertaken to charge fares double those of the tramcars, but that circumstance will not prevent competition resulting to a certain extent. So far as we have noticed, there is no body of conductors in the Metropolitan area more alive to the needs of the case than those of the Croydon Corporation. Judging from recent observation, the conductors do not wait to be attracted, but hail any person who is looking towards a car, and stop the vehicle even when it is not near a stopping-place. While the latter procedure would not be practicable on the more busy portions of the London tramway routes, there is scope for conductors to keep a better look-out. The omnibuses, for instance, capture the greater part of the short distance traffic, especially women shoppers. One reason why the latter use the omnibuses is because of the cushioned seats of the interior. Although cushions are a necessity on omnibuses in order to lessen the vibration, tramway authorities would be well advised if they gave consideration to the desirability of providing cushions. There are precedents both for this and for conductors hailing passengers. The late Sir Clifton Robinson used to argue that the expense of keeping cushions clean and in good order was remunerative expenditure, because it provided passengers with a comfortable seat; and cushions are still to be found on the Wimbledon-Tooting and other sections of the London United Tramways, where there is a heavy working-class traffic. In the days of horse tramcars and omnibuses it was the practice for conductors to invite people to ride, and conductors of motor omnibuses gain a large proportion of their passengers by that means. East Ham Council recently discussed the work of their conductors in view of the falling-off in the gross receipts for 46 weeks of the current year. The member who initiated the debate is stated to have been one of two councillors who some months ago declared that if an omnibus came first they would patronise it. He has now stated that if the conductors followed the example of their competitors there would be quite a different set of men on the cars. Two other councillors took the same line, but the men did not lack defenders, who stoutly maintained that the conductors did their best. The chairman of the Tramway Committee, while saying nothing on the subject of the employees, lectured other officials of the Council for passing the cars and using the opposition conveyances. There is one matter in which Londoners have cause to be grateful to motormen, inspectors, and regulators. Encouraged by their managers, these men discharge a duty that rightly appertains to the police, who show a strange neglect in protecting the public. The manner in which omnibuses, in order to obstruct the roadway to the cars, are driven through people boarding and alighting is an offence against the ordinary law as well as against the Motor Car Act. This procedure was commented on in the report of the Select Committee of the House of Commons, and now the National Society of Chauffeurs have forwarded a resolution to the Commissioner of Police pointing out the dangers of the practice to their members and to the public, and asking that omnibuses shall not be allowed to stop nearer than fifty yards to tramcars. If, as the police declare, they have no power to appoint stopping-places for omnibuses, it would be interesting to know how it is that they have done so in such thoroughfares as the Strand and Fleet Street?

L.C.C. TRAMWAY MATTERS.

HASTENING WORK AT GREENWICH POWER STATION.

At last Tuesday's meeting of the London County Council the Highways Committee reported on the progress of the work at Greenwich generating station for the extension of the plant. A new condenser water intake pipe would not be installed until June or July next; but it was essential that one of the new turbines should be under steam at the earliest possible moment. With this end in view the Committee proposed that a temporary water service should be made to the condenser by means of new pipes connecting it with the existing range of condenser pipes. This work was estimated to cost £450, and it was proposed that the existing contract with the Brightside Foundry and Engineering Company for the provision of piping, etc., should be extended to include the temporary pipes.

TRAVERSER FOR ABBEY WOOD CAR SHED.

A new traverser is required for the extension of Abbey Wood car shed, and the Highways Committee reported that the Brush Company had offered to supply the traverser for £415, to which should be added £10 for extra works, and £12 for the supply of ploughs; and the British Westinghouse Company had offered to supply and erect the electrical equipment for the traverser for £184 5s. These offers were reasonable, and the Committee proposed their acceptance. The orders were practically extensions of existing contracts.

COST OF ADAPTING HORSE CARS AS TRAILERS.

The Committee reported that the work of converting eight horse cars to trailer cars had been completed, and these cars were now run in regular service with generally satisfactory results. After experience had been gained from the trial runs of the first trailer it was found desirable to make several modifications in the equipment and gear beyond those anticipated when an estimate of £1,400 was approved. The principal modifications and additions affect the side gates, lifeguards, fenders, hand brakes, automatic brakes, and signal bells. The total cost of this additional work had amounted to £458. Several tools, jigs, and patterns were made, which would also be available in the future.

MORE DEMANDS FOR INCREASED WAGES.

Requests had been received from the labourers, hammermen, platelayers, point fitters, assistant point fitters, and sand men employed in the permanent way section of the tramway depart-

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ment that their rates of pay should be increased. The Committee were of opinion that the requests should not be acceded to. The men had asked that the applications should be referred to the appropriate conciliation board, and the Committee recommended accordingly.

STEEL BAR FOR MAGNETIC BRAKE SHOES.

The following tenders had been received for the supply of (1) 500 tons special section rolled steel bar for type 25 A magnets, and (2) 84 tons special section rolled steel bar for type 26 A magnets required in connection with the maintenance of magnetic brake equipments over a period of 12 months :—

Names and addresses of firms.	Prices a ton.								
	Delivered on floor of the Council's central car repair depot.				Delivered in truck to siding at the Council's depot.				
	(1)			(2)			(1)			(2)		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Lilleshall Company	6	10	0	6	10	0	6	10	0	6	10	0
Agent for Societe Anonyme des Acieries d'Angleur	7	1	6	7	1	6	6	10	0	6	10	0
Frodingham Iron and Steel Co.	6	14	9	6	14	9	6	14	9	6	14	9
John Batt and Co.	7	0	0	7	0	0	6	15	0	6	15	0
Cargo Fleet Iron Co...		—			—		6	16	6	6	16	6
Geo. Schultz and Co., Bush Lane, E.C. ..	7	2	6	7	2	6	7	2	6	7	2	6
Earl of Dudley's Round Oak Works ..	7	2	6	7	15	0	7	2	6	7	15	0
P. and W. McLellan	7	2	6	7	15	0		—			—	
H. Bessemer and Co.	8	0	0	8	0	0	8	0	0	8	0	0
W. Bain and Co.	9	0	0	9	10	0	9	0	0	9	10	0
R. Murdoch and Co...	9	5	0	9	5	0	9	5	0	9	5	0
D. Colville and Sons..	9	5	0	9	5	0	9	5	0	9	5	0
Brown and Tawse	9	12	6	9	12	6	9	2	6	9	2	6
Do. do. (alternative)	8	7	6	8	7	6	7	17	6	7	17	6

The Committee had accepted the tender of the Lilleshall Company at £6 10s. a ton for both sections delivered at either place. The total amount of the tender was approximately £3,796.

ADVERTISEMENTS ON CARS.

The Council on the recommendation of the Highways Committee decided to discontinue their advertisement department and to accept the offer of contractors who guaranteed an annual minimum income of about £27,700, after deduction of their commission. All advertisements relating to intoxicating liquors will be subject to the approval of the Highways Committee.

All tramway reports were adopted, and a proposal to prohibit advertisements of intoxicating liquors on the cars was defeated, without debate.

MISCELLANEOUS NEWS AND NOTES.

New Cars for Southampton.—Sanction has been given to the manager to construct three new cars.

Depôt Extensions at Rochdale.—At an estimated cost of £10,000 extensions are about to be made to the tramways depôt. Some new plant will also be provided.

A Lanarkshire Extension.—The extension of the Lanarkshire tramways, Uddingston Cross to Bellshill Cross, by Fallside and Bothwell Park, was opened on February 12. The new line serves an extensive population.

Halfpenny Stage Experiment at Hull.—On February 16 the experiment of instituting three halfpenny stages on the Hessle Road route became operative after 9 a.m., up to which hour the halfpenny fare for the whole route is charged.

The Bradford Cash Bag.—Many inquiries have been received from other Corporations by the Bradford Tramways Department with regard to the patented bag which has been introduced on the tramways there. It is the invention of a local conductor.

Municipal Tramways Association.—It is proposed to hold a meeting of the managers' section of the Association at Plymouth in the early summer. The Plymouth Tramways Committee have appointed a sub-committee to select a date and make arrangements.

Wanted, a Lifeguard.—The London General Omnibus Company are prepared to pay a substantial sum to anyone who can invent a satisfactory lifeguard for the front wheels of motor omnibuses said the chairman, Mr. H. A. Vernet, at the annual meeting on Thursday.

Bradford's Railless Traction Extensions.—Three routes comprised in the extensive scheme of additions to the railless trolley traction installation are to be equipped as soon as practicable, viz., from Bankfoot to Dudley Hill, Bolton Woods to the Shipley boundary, and All Saints' Road to Bolton Road.

Top-Covered Cars Unsuitable for Plymouth.—Owing to the steep gradients and sharp curves existing at Plymouth, where the gauge of the tramways is only 3ft. 6in., the Board of Trade have vetoed a proposal to introduce covers on double-deck cars. The Board are advised that there would be an increased liability of the cars to overturn from wind pressure.

Tenders Required for a Russian Tramway Scheme.—The Marioupol (Russia) Municipality require tenders for the construction and working of an electric tramway. Applications, stating on what conditions the contract would be undertaken are to be sent by May 14 to the Administration Municipale, Marioupol, who will supply further information.

Proposed Municipal Inter-Urban Omnibus Service.—A meeting has been arranged to be held to-day (Saturday) at Blaydon between representatives of the Blaydon, Ryton, and Whickham Councils, with reference to the establishment of a municipal motor omnibus service for the three towns. The Northern General Transport Company have informed Ryton Council that serious difficulty was being experienced in securing delivery of motor omnibuses earlier than the end of March or the beginning of April. The company would open an experimental service at the earliest possible date.

Westhoughton Tramway Scheme.—At a special meeting of the Westhoughton (Lancashire) Council on March 9 a resolution will be submitted in favour of applying for a Provisional Order for the construction of tramways within the Council's area.

Electrical Point Controllers for Liverpool.—Following a trial of an automatic point controller opposite the Town Hall, the Tramways Committee have decided to equip the whole of the system with these controllers as soon as vacancies can be found in the car sheds for the youths now engaged as point operators.

Whistle or Gong?—On the Manchester tramways there is a reminder of the old horse car days in the use by motormen of a whistle for clearing traffic off the rails. While it proves very effective in warning the most noisy motor vehicles that run along the rails in order to escape the granite setts elsewhere, the whistle adds less to the din of the streets than does the gong

Electrical Trades Benevolent Institution.—Mr. Hugo Hirst will preside at the annual festival dinner of the Electrical Trades Benevolent Institution, which is to be held on Wednesday, March 25, at the Trocadero Restaurant. The annual general meeting will be held at the Institution of Electrical Engineers on Wednesday, March 18, at 2.30 p.m. The committee anticipates a large attendance at the dinner.

Self-Propelled Car Scheme for Edinburgh.—The Tramways Committee of the Corporation are considering a scheme, submitted by Councillor Fraser, for the purpose of linking up the Craiglockhart car terminus with the main tramway on Comiston Road, thereby providing a circular route of nearly six miles in length, commencing from Tollcross. It is suggested that self-propelled cars should be used.

Hove and Double-Deck Railless Car Traction.—Sanction was given on February 12 by Hove Council to the Cedes Electric Traction, Limited, to install an experimental over-running railless trolley line in Goldstone Villas, George Street, and part of Church Road. A double-deck car is to be run. Councillor Taylor, chairman of the Traction Committee, mentioned that at present the committee had no idea which of the various systems was the best.

Blackpool Corporation Tramway Employees.—In aid of the fund for furnishing the Tramwaymen's Institute a record whist drive was held at the Tower, when over 1,300 players attended. The officials responsible for the arrangements were Mr. C. Furness, tramways manager and electrical engineer, as the president; Mr. C. Baker, traffic superintendent, as the hon. secretary; Mr. L. Garnett, assistant hon. secretary; Mr. P. R. Baxter, hon. treasurer; and others.

Higher Pay and a Merit Scheme at Southampton.—With a view to encourage applications from the class of men he would wish to see on the cars, Mr. L. Johnson, the tramways general manager, has induced the Council to offer a higher rate of pay at starting and to raise the rates of pay generally, the scales being based on a 60-hour week. The ranks of the motormen are to be filled by promotions from the conductors, but men who have not served as conductors will start at a lower rate of pay. In addition to their pay the conductors will be graded and wear stripes, each carrying 1s. per week for the time worked. Service alone will not qualify for merit rank.

Opposition to the London United Tramways Bill.—A conference of fourteen local authorities in the area served by the London United Tramways Company have recommended their various councils to petition against the company's Bill now before Parliament. The conference ask that powers be not granted for carrying goods and merchandise, nor for running trail cars. It is also recommended that clause 5 be opposed unless the company agree to the insertion of words providing that no tramway or light railway not purchased by a local authority before August, 1935, should be purchaseable by the local authority at that date, and at every period of seven years thereafter.

Welfare Work at Manchester.—The 9th annual party of the Manchester Corporation Tramway Employees' Social and Athletic Society was held at the Co-operative Hall on two recent evenings, when over one thousand members and their friends were present. The President (Mr. J. M. McElroy) presided, and was supported by the Lord Mayor (who has been a member of the Tramways Committee since its inception), the chairman of the Tramways Committee (Alderman Bowes), and other members of the committee. After tea dancing took place, and a whist drive was held. The club has a membership of over 2,000. The members own a sports ground at Levenshulme, and it is now being equipped with a pavilion. The subscription is a penny a week, and this has proved sufficient to pay for the recreation ground and to equip large club-rooms at the tramway sheds. The Princes Road men have also a debating society.

Car and Omnibus Stopping Places Agreement at West Ham.—In view of the vigour that Mr. H. E. Blain, the late manager of the West Ham tramways, showed in prosecuting omnibus drivers who endangered tramcar passengers, it is not surprising to find that West Ham is the first place to arrive at an agreement now that Mr. Blain is one of the chief officers of the London General Omnibus Company. As the result of a conference between representatives of the Corporation and the company the Commisioner of Police has drawn up regulations fixing the stopping places in that borough. In nearly every case it is officially directed that the omnibus "shall not encroach upon the tramway stopping points," and that "when proceeding upon the journey omnibuses shall, when a tramcar has stopped at its point to take up or set down passengers, be driven as far as is reasonably practicable on the right or off side of the stationary tramcar." Conferences are being held between the police, the company, and other local authorities.

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First-Class Cars for Birmingham.—The Tramways Committee have inspected the first of a number of first-class cars which have been ordered, and will be put into operation on the Hagley Road route at the beginning of March. In order to enable passengers the more readily to distinguish the new cars the fronts of the vehicles are painted a different colour. The blinds inside are of better quality, and the seats are cushioned. A new depôt has been opened in Highgate Road.

Tramways and Light Railways Association.—The annual meeting will be held at the Trocadero Restaurant, London, on March 6, at 7 p.m., and will be followed by the annual dinner and smoking concert at 7.45. To fill vacancies on the Council the following members are recommended by that body for election:—Messrs. F. Bland (Edgar Allan and Co.), R. R. Greene (Wallasey Corporation Tramways), R. J. Howley (Joint Manager, British Electric Traction Company), C. W. Mallins (Liverpool Corporation Tramways), A. C. Mason (South Metropolitan Tramways), and R. S. Treselian (Dublin United Tramways Company). The price of each dinner ticket will be 7s. 6d., exclusive of wines, and members are requested to make early application to the Secretary at Caxton House, Westminster, for tickets for themselves and their friends.

Mr. J. B. Hamilton's Advice to Ilkeston.—The Council have discussed a minute presented by the Tramways Committee to the effect that they did not consider it desirable to apply to the Board of Trade for approval of plans prepared by the manager for top covers for the cars with a view to a better protection of passengers during inclement weather. Alderman Shaw, Chairman of the Committee, mentioned that Mr. J. B. Hamilton had strongly recommended top covers, and it was "rather a bit off" to pay a man to give advice and then go to the other extreme and refuse to accept it. They had adopted some of Mr. Hamilton's suggestions, and that was one of the reasons they were taking more money. There was just a possibility the Board of Trade would not give permission for top covers, but he would certainly like to approach the Board. There were plenty of top cars in Birmingham on the narrow gauge, and the Town Clerk told him that in Halifax there was the same gauge as Ilkeston. Councillor Middleton: "And the same gradients." The minute was adopted. Alderman Shaw announced that the Notts. and Derby Power Company were to be asked to supply power at a lower price.

Aberdeen Depôt and Offices Scheme Adopted.—Amid applause the City Council on February 10 adopted the scheme presented by Mr. R. S. Pilcher, the general manager, for the purchase of the Militia Barracks and the adaptation of the buildings to the purposes of a tramways depôt and offices. A central establishment, consisting of offices, car shed, workshops, and club-rooms, Mr. Pilcher considers, would tend to greater economy and greater efficiency. The scheme, he pointed out, would supersede the necessity for providing new offices for the department, and save a probable expenditure of at least £5,000, besides the greater part of the present rent of £120 per annum. Further economy is anticipated by the provision of two entrances to the car depôt. The estimated cost of the complete scheme was:—1st section, including car shed, offices, club-rooms, etc., £11,782; 2nd section, car shed, £0,580; 3rd section, workshops, £7,625; a total of £25,987. Councillor Smith, chairman of the Tramways Committee, said the new depôt would provide room for the new cars which had been ordered, but for which there was at present no accommodation. The success of the department was such that more cars would be necessary again next year. Besides this, motor omnibuses, which would be brought in as the result of their present Provisional Order, had got to be housed. With regard to the workshops at Dee Village, they anticipated a time when they would be too small, but the value of the properties which they might be able to vacate, £9,630, would go towards the scheme proposed.

CONTRACTS AND ORDERS.

Hudson and Bowring, Limited, have recently received orders for 94 sets of "H.B." lifeguards for Barcelona, 55 sets for Odessa, 10 sets for Bournemouth and 5 sets for West Hartlepool.

Batley Council have placed a contract for a 1,200 kw. turbo-generator with the Brush Electrical Engineering Company, and for 500 kw. and 250 kw. rotary converters with the British Westinghouse Company.

Huddersfield Council have accepted the tender of the United Electric Car Company for ten car bodies and trucks, with differential gearing; and of Dick, Kerr and Co., Limited, for electrical equipments for ten cars.

Manchester Council have placed the following contracts:—British Westinghouse Company, Limited, and Bruce Peebles and Co., Limited, converting plant at several sub-stations; Ferranti, Limited, three 53 k.v.a. transformers for sub-stations.

The Railway Track Supply Company of Great Britain, 70½, Gracechurch Street, London, E.C., inform us that the Great Western Railway have recently placed a further order with them for two "Edison-Buckwalter" warehouse trucks. This is the third order received since September from the Great Western Railway.

Glasgow Council have allotted the following orders:—Patented radial axle truck, J. G. Brill Company; cast iron pipes, R. M'Laren and Co., Limited; air filter for Pinkston power station, Heenan and Froude, Limited; asphalt buckets, P. and W. MacLellan, Limited; lead-covered cable, W. T. Henley's Telegraph Works Company, Limited.

London County Council have accepted the following tenders:—Brightside Foundry and Engineering Company, temporary water service for condenser of new turbine for Greenwich power station as an extension of an existing contract, estimated cost £450; Brush Electrical Engineering Company, traverser required for Abbey Wood car shed extension, £437; British Westinghouse Company, electrical equipment for traverser, £184 5s.; W. H. Smith and Son, contract for advertising business on tramcars for nine years; Lilleshall Company, 500 tons rolled steel bar for type 25 A magnets of magnetic brakes and 84 tons for type 26 A magnets, £6 10s. a ton, total £3,766.

The Titan Trackwork Company, Limited, have recently received contracts for special trackwork from the following tramways:—Leeds Corporation, Newcastle Corporation, Rangoon Electric Tramways, London United Tramways, Coventry Corporation, Halifax Corporation, Sheffield Corporation, Rochdale Corporation, and Oldham, Ashton and Hyde Electric Tramways.

PERSONAL.

Mr. C. Barber has been appointed manager of the municipal department of Mr. Conway Jenkins of 175, Piccadilly, London, W., concessionaire for the "Fram" electric vehicles.

Mr. G. H. Baillie has been awarded the Crompton Medal of the Institution of Automobile Engineers for the best paper during the session 1912-13. His paper dealt with springs.

Mr. C. N. Hefford, manager of Leeds Corporation electricity department, has been presented by the power consumers with a large silver candelabrum in appreciation of his efforts in maintaining an efficient service during the recent strike.

Mr. G. J. Walker, who has acted as chairman of Aberdeen Suburban Tramways Company since its inception, has asked to be relieved from the duties of his office as a director. In their annual report the board state that Mr. Walker's services as a director have been of great advantage to the company.

Mr. S. Dudman, the manager of the new Notts and Derbyshire Tramways Company, presided at the first supper of the employees. Mr. F. E. Saunders, operating engineer for Balfour, Beatty and Co., Limited, and Messrs. W. H. P. Wight and H. C. Thomas, the constructional engineers, were among the chairman's supporters.

Mr. Harry A. Blackburn, who has just completed his apprenticeship with Messrs. Workman and Clark, Queen's Island, Belfast, has joined the British Westinghouse Electric and Manufacturing Company, Limited, Trafford Park, Manchester. He is the only son of Mr. A. A. Blackburn, M.I.E.E., M.I.Mech.E., chief engineer, Belfast City Tramways.

Mr. F. Ayton, engineer and manager, Ipswich Electricity Works and Tramways, has been granted a bonus of £100 by the Council for the year ending March 31 next, and a similar bonus for the following year. In 1910 Mr. Ayton received an increase in his salary, when he undertook to remain in the Council's service for five years from that period.

Mr. E. G. Mawby, borough surveyor, Leicester, has asked the Electricity and Tramways Committee to recognise in a tangible way the services he has rendered in the laying of the tramway track. He has all along contended that this work was outside his duties as borough surveyor, and it has been stated that the Corporation were saved £20,000 by his scheme of track construction.

Mr. J. Brown, the new traffic superintendent of the Ayr Corporation tramways, entered the service of the Doncaster Corporation tramways eight years ago as a conductor. He passed through various grades to that of first-class motorman, and was subsequently appointed traffic inspector. For the vacancy at Ayr there were 120 applicants, and Mr. Brown was highly recommended by Mr. Rayner, the Doncaster manager.

Mr. W. M. Murphy attended a meeting in London on February 18 of the representatives of employers' associations, when a resolution was passed calling upon the Government to set up an inquiry into the working and the effects of the Trades Disputes Act. Mr. Murphy, in supporting the resolution, said employers could beat Syndicalism anywhere. If the community would combine against any attempt to starve or hold it up Syndicalism was bound to be defeated. The answer to a general strike was a general lock-out.

Mr. H. Holliday, engineer and manager to Torquay Tramways Company, was awarded a gratuity at the annual meeting in recognition of a record year. The chairman said the board had great confidence in Mr. Holliday. The results and the excellent condition of the undertaking were ample evidence of his abilities as a manager. Mr. Holliday is the son of the engineer and manager of the Hastings and District Tramways Company, and he went to Torquay from the former town when the tramways were installed in 1907. He conducted the undertaking through all the difficulties of the Dolter system, which was replaced by the trolley system. At the beginning of May Mr. Holliday will take up the duties of engineer and manager of the Rhondda Tramways Company.

Mr. L. C. F. Bellamy, general manager and electrical engineer, Ilkeston Corporation tramways, and Mr. Brown, his chief assistant, were recommended by the Tramways Committee for increases of salary to £230 and £150. During a discussion by the Council it was stated that Mr. Bellamy had not applied for an increase, and that the receipts had gone up considerably. Alderman Shaw, the chairman, said the committee were all agreed that Mr. Bellamy had done excellent work. In Mr. Brown's case a member stated that he had refused the offer of a more lucrative post because Mr. Bellamy did not want to lose him. Eventually the Council decided to increase the salaries only by the annual increments, viz., £215 and £140. It was agreed to appoint a second inspector.

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FINANCIAL REPORTS AND MEETINGS.

Lancashire United Tramways Company.—The result of the working of this and the operating companies for 1913 shows a profit of £27,653, but after deducting interest on prior lien debenture stock and expenses, there remains the sum of £158, which has been carried to depreciation account. There is also an undivided surplus on the year's working of the operating companies, after payment of interest and dividends, of £14,994.

The British Electrical Federation.—The traffic statement for the week ended February 13, 1914, shows that the receipts from tramways and railways amounted to £38,576, as compared with £36,428 in the corresponding week last year, and from omnibuses £12,113, as compared with £2,081, making a total of £50,689, as compared with £38,509. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year the receipts show an increase of £1,987 upon the week.

London General Omnibus Company.—Mr. H. A. Vernet, who presided at the meeting of the London General Omnibus Company, on February 19, said that the results of the year showed substantial progress. The gross receipts amounted to £3,258,197, and the working expenses to £2,769,826. The total to be dealt with was £346,729, and they proposed to pay a dividend of 10 per cent. for the last six months of the year. For the year the 'buses owned or worked by the company had carried 676,328,145 passengers, an average of 1,853,000 a day, at an average fare of 1.33d.

Bristol Tramways and Carriage Company.—Sir George White, Bart., presiding at the annual meeting on February 18, said that the report and accounts showed substantial progress, especially in the carriage department. The directors were able to pay an increased dividend, and looked forward more hopefully to the future. The reserve fund was now practically equivalent to £5 per share of the ordinary share capital. There were no tramways belonging to the Corporation, neither had they as yet been able to decide whether or not to purchase any tramways. The Corporation Bill was, in fact, premature and without precedent, and would receive the determined opposition of the directors.

Paisley District Tramways.—For 1913 the revenue of this company was £62,876 and expenses £41,476, leaving £21,400. Out of a net sum of £16,041 available, £4,500 is placed to general reserve, £3,750 has been paid for dividend for half-year on 5 per cent. cum. pref. shares, £1,000 placed to pref. share sinking fund for half-year to June 30, and £1,620 paid as interim dividend at rate of 2 per cent. per annum for half-year to June 30 on ordinary shares. The directors recommend applying £3,750 to final preference dividend, £1,000 to preference share sinking fund, and £2,864 forward. Traffic receipts show an increase of £4,129 and expenses an increase of £5.807.

Tyneside Tramways and Tramroads Company.—The half-yearly meeting was held at Newcastle on February 10, Dr. J. T. Merz presiding. The chairman said the profits of the past year were £4,349, or £1,681 more than in the previous year. The report was adopted, and the chairman and Lord Armstrong (directors) were re-elected. Dividends were declared as appended:—On the preference shares at the rate of 5 per cent. per annum, £601; on the ordinary shares at the rate of 2½ per cent. per annum, being at the same rate as paid for the corresponding half-year. To the credit of reserve for renewals, depreciation and other contingencies £1,400 was placed, increasing the fund to £16,086, leaving to be carried forward £387. The dividend paid on ordinary shares for the whole year is an increase of ¼ per cent.

The Year's Working at Hull.—The Mayor (Councillor Hargreaves), presiding at a meeting of the Tramways Committee on February 17, said the year's working showed a net surplus of £12,385. The previous year it was £13,485. The Committee had had to pay £11,503 (£4,182 more than in the previous year) in rent, rates, and taxes, the increase being due to the decision of the House of Lords in the Tottenham rating appeal. The previous year the Committee voted £12,000 towards the relief of the rates; this year he suggested that £7,000 should be so allocated, and the remaining £5,000 set aside as a reserve fund which could be used for providing shelter on the platforms of the 160 cars for the protection of the drivers. Alderman Gillett said he thought that £5,000 was far too much to set on one side for that purpose. At Birmingham the cars had a very simple shelter arrangement.

The Edinburgh and District Tramways Company.—The report of this company for the year ended December 31, 1913, presented at the annual meeting, shows that the cable installation is still working with remarkable economy. The receipts, working expenses, and so forth are given below with the figures for the previous year:—

	1913	1912	Increase or Decrease	1913 Per Mile Run.	1912 Per Mile Run.
Receipts—				Pence.	Pence.
Traffic receipts ..	£292,287	£295,096	—£2,809	10.83	10.61
Other receipts ..	2,815	2,372	+ 443	0.10	0.08
Total receipts ..	£295,102	£297,468	—£2,366	10.93	10.69
Expenditure—					
Working expenses and general charges .	£155,847	£151,776	+£4,071	5.77	5.45
Corporation charges for rent, etc. ..	112,678	111,759	+ 919	4.18	4.02
Total expenditure..	£268,525	£263,535	+£4,990	9.95	9.47
Profit	£26,577	£33,933	—£7,356	0.98	1.22

Mr. B. Hall Blyth, speaking at the annual meeting, said that the strike prevented any comparison being made with the preceding year. An increase of £3,500 in the coal bill was entirely due to the price of coal, which last year cost 9s. 10.25d., as against 7s. 5.69d. for 1912. For the current year they had been able to make contracts at a slightly less figure. The receipts amounted to £295,102, which was £2,366 less than for the previous year. The net profit was £26,577, which was £7,356 less. They had put £9,000 further to the general reserve, which would be mainly used in renewing lines, and the balance, after payment of the dividends mentioned in the report, had been divided between deferred and preferred shareholders. The line to Slateford, which was forced upon them by the Corporation, was run last year at a loss of £1,170. They had entered into an agreement with the Corporation for the working of certain motor omnibuses on the south side. They had agreed to work the omnibuses for the Corporation, undertaking no liability whatever, except that they gave the service of the officials of the company. If the vehicles paid the Corporation got the whole profit, and if there was a loss the Corporation would bear it.

WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended February 14 amounted to £223,054, or £14,614 more than in the corresponding week last year, while the track mileage was 2,862, or 80 more than for the corresponding week. The receipts were at the rate of £77 18s. 8d. per track mile, an increase of £2 19s. 8d. per mile as compared with last year.

(Continued from page 160.)

CORPORATION OF DURBAN, NATAL.

ELECTRIC TRAMWAYS.

TRAM RAILS.

The Corporation of Durban, Natal, is prepared to receive tenders for the supply and delivery, free on board, of:—

(a) Twelve Miles of Steel Girder Tram Rails of British Standard Section No. 2, 95lb. per yard, together with Fish-plates, Bolts and Nuts, and Tie-bars, and

(b) 3,000 Copper Rail Bonds and 275 Cross Bonds.

Specifications may be obtained from the undersigned. For the specifications a deposit of two guineas will be required, which sum will be returned on receipt of a *bonâ-fide* tender.

Sealed and endorsed tenders to be delivered to the undersigned on or before Wednesday, March 11, 1914.

The lowest or any tender will not necessarily be accepted.

By order, WEBSTER, STEEL AND CO.,
Agents to the Durban Corporation.

5, East India Avenue,
Leadenhall Street, London, E.C.,
February 13.

EXETER CORPORATION TRAMWAYS.

UNIFORMS.

The Tramways Committee invite tenders for the supply of Uniforms and Caps.

Forms of tender and particulars may be obtained on application to the Manager, Eaton Place, Exeter.

Sealed tenders, endorsed "Tender for Tramway Clothing," to be sent to me on or before March 7 next.

The Committee do not bind themselves to accept the lowest or any tender.

H. LLOYD PARRY,
Town Clerk.

METROPOLITAN WATER BOARD.

TO MANUFACTURERS OF STEEL RAILS, ETC.

The Metropolitan Water Board invite tenders for the supply of Steel Sleepers and Clips, Steel Rails, Fish-plates, Dog-spikes, etc., to be delivered at the Board's Works, Hampton-on-Thames.

Forms of tender, conditions of contract, and specification may be obtained from the Clerk of the Board, Savoy Court, Strand, W.C., by personal application or on receipt of a stamped addressed brief envelope.

Tenders, enclosed in a sealed envelope, addressed to the "Clerk of the Board, Metropolitan Water Board, Savoy Court, Strand, W.C.," and endorsed "Tender for Steel Sleepers, Rails, etc.," must be delivered at the offices of the Board not later than 10 a.m. on Friday, 6th day of March, 1914.

The Board do not bind themselves to accept the lowest or any tender.

A. B. PILLING,
Clerk of the Board.

Savoy Court, Strand, W.C.
February 18, 1914.

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COUNTY BOROUGH OF ROTHERHAM.

ELECTRIC LIGHT AND TRAMWAYS DEPARTMENT.

The Corporation are prepared to receive tenders for the supply, delivery, and erection of the following Plant :—

1.—One 2,000 kw. High Pressure Turbo Alternator with Condensing Plant, Switchgear, Steam and Exhaust Piping, and Accessories.

2.—One 1,000 kw. Rotary Converter, Transformer, and Switchgear.

3.—One 20-Ton Overhead Crane.

Specifications, general conditions, and other information may be obtained on application to the Borough Electrical Engineer, Electricity Works, Rawmarsh Road, Rotherham, on payment of two guineas, which will be returned on receipt of a *bonâ-fide* tender. Extra copies may be obtained at a charge of 5s. per copy, which will not be returned.

The acceptance of tenders will be subject to the sanction of the Local Government Board being obtained to the necessary loan, and the Corporation do not bind themselves to accept the lowest or any tender.

The person whose tender is accepted will be required to enter into a contract which will contain the "Fair Wages Clause." Sealed tenders, endorsed "High Pressure Turbine," "Rotary Converter," or "Overhead Crane" as the case may be, must reach the office of the undersigned not later than 12 noon on Thursday, March 12, 1914.

CHAS. L. DES FORGES,
Town Clerk.

Town Hall, Rotherham.
February 16, 1914.

RAMSBOTTOM URBAN DISTRICT COUNCIL.

Wanted a set of four second-hand Car Lifting Screw Jacks, with two cross girders 9ft. 6in. overall, to lift to a height of 5ft. Particulars of price, condition of jacks, etc., to be sent to the undersigned by the 25th instant.

JOHN W. BARLOW,
Clerk.

Council Offices, Ramsbottom.

POSITIONS VACANT.

MECHANICAL DRAUGHTSMAN.

Wanted at once, Mechanical Draughtsman, one having experience in Tramway Trucks. Address, stating salary wanted, Anger Manufacturing and Supply Company, Bank Chambers, Preston, Lancs.

THE INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS.

APPOINTMENT OF SECRETARY.

The Council invite applications for the post of Secretary to the Institution. The salary will be at the rate of £400 per annum. Preference will be given to candidates possessing a knowledge of Municipal and County Engineering and literary and administrative ability. Age not to exceed 45 years.

Conditions of the appointment may be obtained on application to the Secretary.

Applications, endorsed "Secretaryship," and accompanied by not more than three testimonials of recent date, must be delivered to the Secretary at the Offices of the Institution, No. 92, Victoria Street, Westminster, S.W., not later than noon on Saturday, February 28.

Canvassing and communicating with members of the Institution with reference to the appointment, either directly or indirectly, are disqualifications; but twelve copies of the applications and testimonials may be sent to the Secretary.

By order of the Council,
THOMAS COLE,
Secretary.

92, Victoria Street, London, S.W.,
February 14, 1914.

DICK, KERR & CO.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

BOROUGH OF COLNE.

TRAMWAYS MANAGER.

The Town Council invite applications for the appointment of Manager of their Electric Tramway System. Commencing salary £225 per annum. Applications, stating age, qualifications, and experience, with copies of two recent testimonials, to be forwarded to the undersigned on or before the 26th instant. Canvassing members of the Town Council in any way will be a disqualification.

ALFRED VARLEY,
Town Clerk.

Town Hall, Colne,
February, 1914.

BOROUGH OF DARLINGTON.

MAINS SUPERINTENDENT.

Applications are invited for the position of Mains and Permanent Way Superintendent in the Darlington Corporation Electricity and Tramways Department. Experience with three wire D.C. mains and E.H.T. three-phase mains essential. Salary £200, rising to £250 per annum.

Further particulars of the position and a special form, on which the application must be made, can be obtained from the Borough Electrical Engineer, Electricity Works, Darlington, and the applications must reach me not later than March 2, 1914.

H. G. STEAVENSON,
Town Clerk.

Darlington, February 17, 1914.

COUNTY BOROUGH OF SALFORD.

Applications are invited for the position of Borough Electrical Engineer. Salary £1,000 per annum. Full particulars supplied on application to me. Canvassing either directly or indirectly will disqualify.

Applications must be delivered to me not later than Saturday, February 28, 1914.

L. C. EVANS,
Town Clerk.

Salford.

COPPER AND ALUMINIUM MARKET.

February 20, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

	Friday, February 20.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	64 17 6	65 12 6	64 7 6
,, ,, (three months)	65 10 0	66 2 6	64 10 0
Electrolytic Copper—bars or ingots ..	68 0 0	68 5 0	68 10 0
Aluminium—bars or ingots	83 0 0	83 0 0	80 0 0

COAL MARKET.

February 20, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

	Friday, February 20.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	s. d.
Best Admiralty Welsh (large)	23 6	23 6	24 0	25 0
Best Seconds	23 3	23 3	23 3	23 3
Ordinary Drys	21 9	21 9	22 0	23 0
Best Washed Nuts	21 0	21 0	21 6	21 6
Best Washed Peas	19 6	19 6	20 0	19 0
Cardiff, f.o.b.—				
Best Admiralty (large) ..	19 0	19 0	19 0	20 0
Best Seconds	18 9	18 9	18 3	18 3
Ordinary Drys	17 3	17 3	17 0	18 0
Best Washed Nuts	16 6	16 6	16 6	16 6
Best Washed Peas	15 0	15 0	15 0	14 0
Newcastle, f.o.b.—				
Best Steams	14 9	14 6	15 0	16 6
Best Seconds	11 9	12 0	14 6	15 0
Smalls	6 9	6 9	10 9	12 0

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregate. Wks.	Aggregate. 1913-4.	Aggregate. Increase or Dec.
Anglo-Argentine	Feb. 11	£54,907	£58,466	6	£313,042	+ £15,761
Auckland (28 days)	Jan. 16	21,653	25,633	29	135,538	— 3,874
Ballarat and Bendigo	Dec.	3,863	3,850	38	34,575	— 724
Brazilian St. Rly. Mlrs.	Dec.	47,512	57,250	22	264,464	+ 45,611
Brazilian Traction	Feb. 14	88,326	95,232	7	660,691	+ 51,324
Brisbane	Jan.	24,810	28,330	4	28,330	+ 3,520
British Columbia $	Dec.	773,741	793,219	26	4,553,726	+ 302,902
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacroze	Jan.	44,601	43,651	30	316,546	+ 8,887
Calcutta Rs.	Feb. 14	60,302	67,952	7	4,80,370	+ 20,810
Cape Town	Jan.	...	14,646	...	...	...
Carthagena & Herrerias	Jan.	3,324	2,776	4	9,776	— 548
Cordoba	Dec.	12,266	12,863	39	120,318	+ 11,081
East India	Jan.	1,850	1,938	26	11,817	+ 437
Kalgoorlie	Dec.	3,206	2,907	52	34,510	— 3,300
La Plata	Jan.	5,575	5,296	4	5,296	— 279
Lima	Sept.	22,660	34,110	39	300,647	+ 23,783
Lisbon Mlrs.	Sept.	...	144,538	...	...	...
Madras (14 days) Rs.	Feb. 15	25,388	28,738	6	86,677	+ 8,369
Melbourne	Dec.	...	69,000	...	...	...
Mexico $	Jan.	561,635	579,361	4	285,348	— 6,028
Montevideo	Jan.	38,061	38,256	18	102,095	— 72
Para	Feb. 15	4,266	3,565	11	37,278	— 7,685
Port Elizabeth	Jan.	...	19,476	...	...	...
Shanghai $	Feb. 4	22,718	25,000	5	122,000	+ 22,995
Singapore $	Feb. 14	12,082	13,924	7	84,493	+ 5,828
Toronto $	Nov.	742,156	849,279	48	8,893,984	+1,176,680
Winnipeg $	Dec.	361,700	379,863	52	4,078,694	+ 313,310

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1913-4.	Increase or Dec.
Aberdeen Corporation..	Feb. 11	£1,379	£1,473	+ £91	37	£59,678	+ £3,308
Accrington Corp.	,, 11	539	559	+ 20	45	25,963	+ 2,243
Ayr Corporation	,, 14	197	234	+ 37	39	14,842	+ 2,114
Bath Electric	,, 11	681	733	+ 52	6	4,131	— 118
Birkenhead Corp.	,, 15	1,108	1,244	+ 136	46	59,381	+ 5,404
Birmingham Corp.	,, 14	11,894	12,678	+ 1,294	46	547,243	+ 45,599
Blackburn Corporation	,, 11	1,247	1,105	— 142	46	59,740	+ 4,904
Blackpool Corporation	,, 12	468	532	+ 64	45	80,169	+ 12,405
Bolton Corporation	,, 15	2,538	2,707	+ 169	46	125,991	+ 7,030
Bournemouth Corp.	,, 18	1,490	1,646	+ 156	46	91,730	+ 9,533
Bradford Corporation...	,, 14	4,979	6,266	+ 1,287	45	271,434	+ 16,951
Brighton Corporation...	,, 15	751	796	+ 42	46	49,471	+ 2,895
Bristol	,, 13	6,508	7,236	+ 728	6½	45,970	+ 2,008
British Elec. Federatn.	,, 13	38,509	50,699	*	...	...	...
Burnley Corporation ...	,, 14	1,552	1,629	+ 77	46	78,078	+ 8,064
Burton-on-Trent Corp.	,, 15	249	285	+ 36	46	13,566	+ 680
Bury Corporation	,, 15	1,205	1,302	+ 97	46	61,855	+ 2,352
Cardiff Corporation	Jan. 31	2,438	2,532	+ 94	44	119,680	+ 11,185
Chatham and District..	Feb. 12	829	804	— 25	6	4,847	— 403
Chesterfield Corp.	,, 12	238	260	+ 22	45	11,813	+ 1,283
Colne & Trawden	,, 14	223	261	+ 38	7	1,637	+ 76
Cork Electric	,, 12	449	460	+ 11	6	2 681	— 73
Croydon Corporation ...	,, 6	1,445	1,546	+ 101	44	73,244	— 6,350
Darlington Corporation	,, 14	219	249	+ 30	46	11 463	+ 1 038
Derby Corporation	,, 14	862	978	+ 116	46	45,044	+ 4,029
Dover Corporation	,, 14	188	192	+ 4	46	11,149	+ 73
Dublin & Lucan	,, 13	106	111	+ 5	6	700	— 20
Dublin United	,, 13	5,454	5,262	— 192	7	32,244	+ 2 549
Dundee City	,, 11	1,190	1,248	+ 58	39	51,121	+ 3.483
East Ham Corporation	,, 14	1,046	1,038	— 8	46	47,523	— 2,261
Exeter Corporation	,, 13	267	294	+ 27	46	15,573	+ 657
Gearless Motor 'Buses.	,, 14	...	443	...	7	2 898	...
Glasgow Corporation ...	,, 14	19.922	20,948	+ 1,026	37	745 936	+ 41,886
Glossop(U.Elec.Supply)	,, 14	121	127	+ 6	7	838	— 11
Halifax Corporation ...	,, 10	1,892	1,961	+ 69	45	95,067	+ 3,428
Hastings & District.....	,, 11	727	711	— 16	6	4,005	— 238
Huddersfield Corp.	,, 14	2,033	2,160	+ 127	46	97,810	+ 4,693
Hull Corporation	,, 14	3,018	3,222	+ 204	46	145,690	+ 7.487
Ilford U.D.C.	,, 14	403	434	+ 31	45	20,627	— 943
Ilkeston Corporation ...	,, 18	114	127	+ 13	47	6,181	+ 863
Ipswich Corporation ...	,, 14	350	384	+ 34	46	20,817	+ 681
Isle of Thanet	,, 14	272	297	+ 25	20	6.699	+ 488
Kilmarnock Corp.	,, 14	151	159	+ 8	39	6.903	+ 442
Lanarkshire	,, 12	1 586	1,785	+ 199	6	11,150	+ 1,144
Lancashire United	,, 11	1,337	1,519	+ 182	6	9,182	+ 1,193
Leeds City	,, 14	7,321	8,130	+ 809	46	372,035	+ 15,252
Leicester Corporation...	,, 14	2,562	2,808	+ 246	7	17,744	+ 845
Leith Corporation	,, 14	629	676	+ 47	39	27,828	+ 1,281
Leyton U.D.C.	Jan. 22	1,193	1,233	+ 41	42¼	57,107	— 190
Liverpool Corporation..	Feb. 14	11,762	12,902	+ 1,140	6	81,807	+ 3,902
Llandudno &Colwyn B.	,, 13	162	152	— 10	11	1,613	— 13
London County Council	,, 11	40,737	41,567	+ 830	44	1,911,244	+ 7.172
London Gnl. Omnibus.	,, 14	51,455	53,495	+ 2,040	7	374,214	— 3,475
London United	,, 13	5,249	5,342	+ 93	7	38.146	— 207
Lowestoft Corporation	,, 14	134	155	+ 21	19	3,596	+ 301
Maidstone Corporation	,, 12	161	160	— 1	46	9,266	+ 594
Manchester Corp.	,, 14	16.016	17,335	+ 1,319	46	805,332	+ 35,208
Met. Elec. Trys.	,, 13	8,428	8,417	— 11	7	51,886	— 875
Nelson Corporation	,, 14	170	202	+ 32	41	9,571	+ 535
N'castle-on-Tyne Corp.	,, 14	4,578	5,012	+ 434	46	226,391	+ 21,477
Newport (Mon.) Corp....	,, 14	680	766	+ 86	46	35.327	+ 2,462
New St. Helens & Dist...	,, 13	695	737	+ 42	33	26.787	+ 2,402
Northampton Corp	,, 13	525	535	+ 10	46	26,312	+ 1,501
Nottingham Corp.	,, 13	3,053	3,189	+ 136	45½	152,179	+ 6,487
Oldham Corporation ...	,, 15	1,991	2.155	+ 164	47	103,547	+ 7,213
Portsmouth Corp.	,, 14	1,705	1,800	+ 95	46	103,203	+ 6,552
Preston Corporation ...	,, 11	787	837	+ 50	46	40 519	+ 2,418
Provincial	,, 14	1,528	1,622	+ 94	19	33,608	+ 1,841
Reading Corporation ...	,, 12	610	654	+ 44	45	31.719	+ 2,205
Rochdale Corporation	,, 14	1,385	1,546	+ 161	46	73,383	+ 3,100
Rotherham Corp.	,, 18	839	1,032	+ 193	46	46,979	+ 9,790
Salford Corporation ...	,, 16	4,661	5,137	+ 476	46	240,486	+ 11,076
Sheffield Corporation ...	,, 15	7,081	7,530	+ 449	47	345.163	+ 25,063
Southampton Corp.	,, 11	1,145	1,183	+ 38	45	59.633	+ 3.094
Southend-on-Sea Corp.	,, 11	572	666	+ 94	46	42,489	+ 7,206
South Met. Trys.	,, 13	720	945	+ 225	7	6,070	+ 1,585
South Shields Corp.	,, 14	618	713	+ 95	46	33,088	+ 3,788
Sunderland Corp.	,, 15	1.232	1,365	+ 133	46	66,418	+ 6,029
Sunderland District ...	,, 11	494	556	+ 62	15	8.495	+ 955
Swindon Corporation ...	,, 11	153	159	+ 4	45	7,509	+ 386
Trys. (M.E.T.) 'Buses	,, 14	526	8,020	+ 7,494	7	51.645	...
TynesideTrys.&Tmrds	,, 11	480	489	+ 9	6	2,751	+ 111
Wallasey Corporation	,, 14	944	1,109	+ 125	46	55.655	+ 5,018
Walsall Corporation ...	,, 14	572	663	+ 91	7	3,952	+ 49
Walthamstow U.D.C....	,, 14	602	693	+ 91	46	34,119	+ 1,388
Warrington Corp	,, 1	469	463	— 6	40	17,732	+ 473
West Ham Corporation	,, 12	2,499	2 671	+ 172	45	123,719	+ 3,784
Wigan Corporation	,, 13	1,381	1.451	+ 70	45½	67,919	+ 6,134
Wolverhampton Corp	,, 18	942	1,070	+ 128	47	50.441	+ 2,539
Yorkshire (W. Riding)	,, 15	1,266	1.405	+ 139	7	9,914	+ 742

* From such of the services as were working both last year and this year the receipts show an increase of £1,987 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London	Feb. 14	£5,500	£5,049	— £451	7	£36,317	— £2,449
City and South London	,, 14	3.099	2,818	— 281	7	20,124	— 1,468
Liverpool Overhead	,, 15	1,525	1,634	+ 109	7	11,655	+ 418
London Electric	,, 14	14.625	14,595	— 30	7	102.890	— 750
Mersey	,, 14	2.287	2,264	— 23	7	15.893	+ 24
Metropolitan	,, 15	16,145	17.653	+ 1,508	7	126.090	+ 10,534
Metropolitan District	,, 14	13,189	13.368	+ 179	7	92.301	— 629

The Tramway & Railway World can be obtained, post free, at the following rates:—

For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For places abroad—Thirty Shillings per annum.

Tel. No.: **2943** Gerrard.
Telegraphic Address: "**Tramigro,**" **London.**

AMBERLEY HOUSE, NORFOLK ST., W.C.

TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, February 20.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	70 — 73
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	...	4⅞ — 5⅛
5	Do. 5½% Cum. 2nd Pref.	...	4⅜ — 4⅝
100	Do. 4% Deb. Stk. Red.	— ½	92½ — 94½
100	Do. 4½% Deb. Stk. Red.	...	96½ — 99½
100	Do. 5% Deb. Stk. Red.	...	96½ — 98½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 —106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅞ — 1
1	Do. 5% Cum. Pref	...	⅝ — ¾
100	Do. 4½% 1st. Mort. Deb. Stock, Red.	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	...	85 — 87
10	Blackpool and Fleetwood Tramroad Co.	...	14½ — 15½
	Bombay Elec. Supply and Trams. Co., Ord.	— 1	13½ — 14½
10	Do. do. 6% Cum. Pref.	...	10¾ — 11¼
100	Do. do. 4½% Db. Stk Rd.	...	94½ — 96½
$100	Brazilian Traction Light and Power Co., Lim.	— 2	90 — 92
5	Brisbane Elec. Trams. Investment Co. Ltd., Ord.	...	7½ — 8½
5	Do. do. 5% Cum. Pref	...	4¾ — 5¾
100	Do. do. 4½% 1st Deb Stock, Red.	+ 2	99 —102
10	Bristol Tramways and Carriage Co.	+ ¼	6¼ — 7¼
10	Do. do. 4% Cum. Pref.	...	7 — 7½
100	Do. do. 4% Deb. Stock	...	100 —102
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	...	121 —125
100	Do. Pref. Ord. Stock	...	107 —111
100	Do. 5% Cum. Perpetual Pref. Stock	...	103½ —106½
100	Do. 4½% 1st Mort. Debs.	...	98 —101
40	Do. 4½% Vancouver Power Debs.	...	94 — 98
100	Do. 4½% Perpetual Cons. Deb. Stk.	...	95 — 98
100	British Elec. Traction Co., Lim., 6% Cum. Pref.	...	90 — 93
10	Do. 7% Non-Cum. Pref.	...	57 — 60
10	Do. 6% Pref. Ord. Non-Cum.	...	16½ — 18½
100	Do. Deferred Ord. Stock	...	7½ — 9½
100	Do. 5% Perpetual Debenture Stock.	+ ½	93½ — 96½
100	Do. 4½% Second Debenture Stock, Red	...	80 — 83
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	73 — 78
100	Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb.	...	99 —101 xd
5	Calcutta Tramways Co., Limited. Ord.	...	6 — 6¼
5	Do do. 5% Cum. Pref.	...	5 — 5¼
100	Do. do. 4½% 1st Deb. Stock, Red.	...	96 — 99
1	Cape Electric Tramways, Ld.,	...	⅝ — ¾
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	3 — 3¼
100	Do. 5% Debs., Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co. (1904), Lim.	— ⅛	5⅛ — 5⅜
100	Do. 4% Debenture Stock Red, 1935	...	91 — 96
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.	...	89 — 93
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	— ½	94½ — 96½
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	— 6⅞
10	Dublin United Trams. Co. (1896) Lim. Ord.	— ¼	— 10¾ xd
10	Do. do. 6% Pref.	...	— 12¾
100	Do. do. "A" Red.	...	— 80¼
100	Do. do. Deb. Stock "B" Red.	+ ¼	— 79¼
10	Gateshead & Dist Trys. Co., Ord.	...	8¾ — 9¾
10/-	Hastings & Dist. Electric Trams. Co. Ld., Ord.	...	⅝ — ¾
1	Do. do. 6% Cum. Pref.	...	¾ — ⅞
100	Do. do 4½% Deb. Stk. Red.	— 1	67 — 72
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	93½ — 97½
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)	...	86 — 90
10	Imperial Tramways, Ord.	...	3 — 3½
10	Do. do. 6% Cum. Pref.	...	6¼ — 6½
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.	...	2 — 2½
100	Do. 4% Debenture Stock	...	71 — 76
1	Kalgoorlie Elec. Trams., Ltd.	...	0 — ⅛
100	Do. do. 5% "A" Deb. Stk.	...	85 — 90
100	Do. do. 6% "B" do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.	...	¾ — 1
10	Lanarkshire Tramways Co.	...	9¼ — 10¼ xd
100	Lancashire United Tramways. 5% Prior Lien Deb.	+ 2	85 — 87
1	Lisbon Electric Trams., Lim., Ord.	...	1⅛ — 1⅜
1	Do. 6% Cum. Pref.	...	⅛ — 1⅛
100	Do. 5% Mort. Debs.	...	91 — 96
1	London and Suburban Trac. Co., Lim., Ord.	...	¾ — ⅞
100	London General Omnibus Company, Limited. 4½% Deb.	...	97½ — 99½
100	Do. Do. 5% Cum. Inc. Deb. Stk. Red.	...	90 — 93 xd
100	London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red	— 1½	63 — 67
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref.	...	5 — 5¾
5	Do. do. 5% Deb. Stk., Red.	...	101 —103
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	79 — 82
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	— 2½	112 —115
$1,000	Do. do. 5% Bds.	+ 1	98 —100 xd
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	⅞ — 1
100	Metropolitan Elec. Trms. Ltd. 4½% Deb. Stock, Red.	+ 2	92 — 95
100	Do. 5% Deb. Stock, Red.	...	90 — 93
100	Mexico Tramways Co., Common Stock	— 2	70 — 74
500	Do. Gen. Con. 1st Mort. Gld. Bonds	— 2	78 — 83
100	Do. 6% 50-yr. Mort. Bonds	— 2	81 — 85
...	Michigan United Railways 5% 1st Mort. Gld. Bonds	...	91½ — 93½
100	Montreal Street Railway, Sterling 4½% Debs. (1922)	...	98 —100
100	Do. 4½% Sterling Debs, (1922)	...	99 —101
1	National Steam Car Co. Ltd.	— ⅜	⅛ — ⅜
10	Oldham—Ashton and Hyde Elec. Ord.	+ ⅛	5⅞ — 6⅛
10	Do. do. 5% Cum. Pref.	...	5⅝ — 5⅞
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	4⅞ — 5⅛
5	Do. do. 6% Cum. Pref.	...	4⅛ — 5
1	Perth (W.A.) Elec. Trams., Ld., Ord.	...	—
1	Potteries Electric Traction Co., Ltd., Ord.	...	¾ — ⅞
1	Do. 5% Cum. Pref.	...	17/32 — 19/32 xd
100	Do. 4½% Debenture Stock, Red.	...	84 — 87
1	Provincial Tramways, Lim., Ord.	...	23/32 — 27/32
10	Do. 5% 1st Deb. Stock	...	95 — 98
...	Puebla Tramway, Light & Power Co., Prior Lien 5%	...	80 — 84
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.	...	5 — 5⅝
100	Do. do. 4½% 1st Mt. Db. Stk	...	95 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	89 — 91
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	— ½	100¼ — 102¼
100	Do. do. 5% 50-yr. Mort. Gold Bonds	— ½	93½ — 95½
100	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	...	100 —103
$500	Do. 5% 1st Mort. Debs., Red., 1929	...	99 —102 xd
10	Shanghai Elec. Construction Co.	...	11¾ — 12¾
100	Singapore Elec. Tramways Lim., 6% Debs. Red	...	87 — 91
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref.	...	⅝ — ¾
100	Do. do. 4% Deb. Stk.	...	66 — 70
...	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	— 1	97 — 99
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	98 —100
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	82½ — 84½
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	93 — 95
5	United Elec. Tramways of Monte Video, Ord.	...	4⅝ — 5⅛
5	Do. do. 6% Cum. Pref.	...	4⅞ — 5⅜
100	Do. do. 5% 1st Deb. Stk. Red.	...	94 — 97
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	96 — 99
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	3⅞ — 4⅛
5	Do. do. 6% Cum. Pref.	...	4⅝ — 4⅞
100	Do. do. 4½% 1st Deb. Stock. Red.	...	89 — 92

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF BLACKPOOL.

TRAMWAYS DEPARTMENT.

The Tramways Committee invite tenders for the supply and delivery of six new open type Bogie Cars in accordance with the particulars to be obtained upon application to the undersigned.

Tenders, in sealed envelopes, to be addressed to the Chairman, Tramways and Electricity Committee, West Caroline Street, Blackpool, and endorsed "Tender for New Cars," to be received not later than Wednesday, March 25, 1914.

The Corporation do not bind themselves to accept the lowest or any tender.

CHARLES FURNESS,
General Manager.

General Offices,
West Caroline Street, Blackpool.
February 25, 1914.

MANCHESTER CORPORATION TRAMWAYS.

The Tramways Committee of the Manchester Corporation are prepared to receive tenders for the supply and delivery of the following:—

(a) Tramway Rail Bonds.
(b) Hard-drawn Copper Trolley Wire.
(c) Span-wire Brackets, for Tramway Poles.

Specifications and forms of tender may be obtained on application to Mr. J. M. McElroy, General Manager, Corporation Tramways, 55, Piccadilly, Manchester. Applications for specifications, etc., for (c) span-wire brackets, must be accompanied by a deposit of £1 1s., which will not be returned except on receipt of a *bonâ-fide* tender. Tenders are to be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, and must be received not later than 10 a.m. on Tuesday, March 17, 1914.

The Committee do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester,
February 27, 1914.

METROPOLITAN ASYLUMS BOARD.

TO ELECTRICAL ENGINEERS AND OTHERS.

The Metropolitan Asylums Board invite tenders for the installation of Motor Generator, Switchgear, Battery Charging Board, and Connections, etc., at the Queen Mary's Hospital, Carshalton, Surrey, in accordance with drawing, specification, prepared by Mr. W. T. Hatch, M.Inst.C.E., M.I.Mech.E., Engineer-in-Chief.

The drawings and specification, and form of tender may be inspected at the Office of the Board, Embankment, E.C., on and after 10 a.m. on Friday, February 27, and can then be obtained upon payment of a deposit of £1. The amount of the deposit will be returned only after the receipt of a *bonâ-fide* tender sent in accordance with the instructions on the form of tender, and after the drawing and the other documents have been returned.

Tenders, addressed as noted on the form, must be delivered at the Office of the Board, not later than 2.30 p.m. on Wednesday, March 11, 1914.

(By Order), T. DUNCOMBE MANN,
Clerk to the Board.

February 23, 1914.

ILFORD URBAN DISTRICT COUNCIL.

TRAMWAYS ANNUAL SUPPLIES.

The above Council invite tenders for certain Stores required by their Tramways Department during the year commencing April 1, 1914.

Particulars, conditions, and forms of tender may be had on application to Mr. L. E. Harvey, A.M.I.E.E., Tramways Manager, Tramways Depôt, Ley Street, Ilford.

Sealed tenders, endorsed "Tender for Tramway Stores," must be addressed and delivered to me at the Town Hall, Ilford, on or before noon on Saturday, the 14th day of March, proximo.

The Council do not bind themselves to accept the lowest or any tender.

By order, A. PARTINGTON,
Clerk of the Council.

Town Hall, Ilford,
February 23, 1914.

PLYMOUTH CORPORATION TRAMWAYS.

TICKET PUNCHES.

Tenders are invited alternatively for the Purchase or Hire of Ticket Registering Punches for use upon the Corporation Tramway System.

Full particulars and conditions, together with form of tender, can be obtained upon application to the undersigned.

Tenders, endorsed "Tramway Punches," must be received at my office on or before March 19 next.

The Corporation does not bind itself to accept the lowest or any tender.

J. H. ELLIS,
Town Clerk.

Municipal Buildings, Plymouth,
February 10, 1914.

PLYMOUTH CORPORATION TRAMWAYS.

Tenders are invited for the supply of Tickets for use on the Corporation Tramway System.

Full particulars and specification and general conditions, together with form of tender, can be obtained on application to the undersigned.

Tenders, endorsed "Tramway Tickets," must be received at my office on or before March 19 next.

The Corporation does not bind itself to accept the lowest or any tender.

J. H. ELLIS,
Town Clerk.

Municipal Buildings, Plymouth,
February 10, 1914.

COUNTY BOROUGH OF ROCHDALE.

TRAMWAYS DEPARTMENT.

CONTRACT FOR STORES.

The Tramways Committee of the Rochdale Corporation invite tenders for the following Stores for the year ending March 31, 1915:—

Gears and Pinions; Cast Iron and Malleable Iron Castings; Brass Castings; Iron and Steel; Springs; Ironmongery; Paints and Varnishes; Timber; Overhead Materials; Stationery and General Stores.

Further particulars, with forms of tender, may be had on application to the General Manager, Mr. George Webster, Tramway Offices, Mellor Street, Rochdale, on payment of the sum of 5s. for each form of tender, which amount will be refunded on receipt of a *bonâ-fide* tender.

Samples can be seen at the Tramway Offices. Tenders, addressed to the Chairman of the Tramways Committee, Tramway Offices, Mellor Street, Rochdale, must be delivered not later than 12 o'clock noon on Thursday, March 12, 1914.

The Corporation do not bind themselves to accept the lowest or any tender.

(Sd.) WM. HENRY HICKSON
Town Clerk.

Town Hall, Rochdale,
February 26, 1914.

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LANCASTER CORPORATION.

TRAMWAYS COMMITTEE.

The Tramways Committee of the Lancaster Corporation invite tenders for the supply of Uniforms, etc., in accordance with the samples and detailed list deposited at the Tramway Traffic Manager's Office, Town Hall, Lancaster, from whom further particulars may be obtained.

Tenders, with samples of materials, marked "Tramway Uniforms," to be delivered to the undersigned on or before Friday, March 13, 1914.

T. CANN HUGHES,
Town Clerk.

Town Hall, Lancaster,
February 25, 1914.

COUNTY BOROUGH OF NEWPORT.

Tenders are invited by the Newport Corporation for the supply of Uniform Clothing for the Tramways Department. Particulars may be obtained on application to the undersigned.

The lowest or any tender will not necessarily be accepted.

Samples of style of clothing may be seen on application to the Central Offices.

Tenders must be sent sealed, marked on the outside "Tender for Clothing," and addressed to the Town Clerk, Town Hall, Newport, Mon., and must reach him not later than March 16, 1914.

N. J. YOUNG,
General Manager.

Electricity and Tramways Offices,
Town Hall, Newport, Mon.,
February 24, 1914.

BARNSLEY COUNTY BOROUGH COUNCIL.

The above Council invite tenders for the supply of a Motor Vehicle with a capacity of from 3 to 4 tons for the collection and conveyance of refuse and night soil within the borough. The Council will consider tenders both for steam and petrol motors. Tenders, with full specifications, details, and illustrations of engine and vehicle proposed to be supplied, should be sent to the undersigned not later than the 2nd of March, 1914.

W. P. DONALD,
Town Clerk.

COUNTY BOROUGH OF SUNDERLAND.

TRAMWAYS DEPARTMENT.

STORES.

The Corporation are desirous of receiving tenders for the various kinds of Stores used in connection with the electric tramways, viz.:—Paints and Oils, General Electrical and Car Supplies, Ironmongery, Iron and Steel, Timber, and Overhead Line Materials.

Further particulars, with form of tender, may be had, and samples inspected, on application to the General Manager, Mr. A. R. Dayson, Tramways Offices, Sunderland.

Tenders, in sealed envelopes, endorsed "Tender for Tramway Stores," must be delivered at my office not later than 12 o'clock noon on Thursday, March 26 instant.

The Corporation do not bind themselves to accept the lowest or any tender.

H. CRAVEN,
Town Clerk.

Town Hall, Sunderland,
March 2, 1914.

POSITIONS VACANT.

ERITH URBAN DISTRICT COUNCIL.

CHIEF TRAFFIC INSPECTOR.

The Erith Urban District Council have a vacancy in the Tramways Department for a Chief Traffic Inspector.

Candidates must have been previously engaged in a similar position within the Metropolitan Police area.

Salary, 47s. 6d. to 50s. per week, payable monthly.

Apply, giving age, full and complete particulars of experience, and present occupation, together with copies of testimonials, to the Engineer and Manager, Tramways Depôt and Offices, Walnut Tree Road, Erith.

MAIDSTONE CORPORATION TRAMWAYS.

INSPECTOR.

The above Corporation invite applications for the position of Inspector at a commencing salary of 33s. per week, rising to 35s. at end of first year, if satisfactory. Apply, stating age, qualifications, and present occupation, accompanied by copies of not more than three recent testimonials, to be sent on or before March 5, 1914, to

A. T. LAMBERT,
General Manager and Engineer,
Tonbridge Road, Maidstone.

MILLARS' TIMBER AND TRADING CO., LTD.
PINNERS' HALL, GREAT WINCHESTER STREET, LONDON, E.C.
SUPPLY
JARRAH
THE SANITARY WOOD PAVING
REGISTERED TRADE MARK M.J.
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MINERVA HOUSE,
BEVIS MARKS, LONDON, E.C

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27, CLEMENTS LANE, LONDON, E.C.

Telephone No.: 5735 CENTRAL.
Telegraphic Address: "INBRAKE," LONDON.

British, Foreign and Colonial Representatives:—

BRITISH ISLES. W. C. Knight, 75, Surrey Street, Sheffield. Wm. C. Yuille & Co., 60, Brown St., Anderston, Glasgow. Equipment & Supplies, Ltd., 7, Anglesea Street, Dublin.
FRANCE. Chas. d'Albert, 15, Avenue Larcher, Chatou (S & O).
GERMANY. Heinrich Vellguth, 1, Glockengies-serwall, Hamburg.
BELGIUM. l'Anglo-Belge Electrique, 72, Avenue de Tervueren, Brussels.
SWEDEN. E. & L. Davidson, Grefmagnigatan 15, Stockholm.
SWITZERLAND. G. Sigerist, 8, Mittl. Haldenstrasse, Winterthur.
ITALY. Chas. de Grave Sells, 5, Via Ponte Calvi, Genoa.
SPAIN. Peninsular Engineering Co., Puerta del Angel 10, Barcelona.
SOUTH AFRICA. F. Peabody Rice, 22, Standard Bank Buildings, Johannesburg.
AUSTRALIA. H. A. E. Rothwell, Cromwell Buildings, Bourke Street, Melbourne, Victoria.
NEW ZEALAND. James Jackson, Box 731, G.P.O., Wellington.
JAPAN. W. M. Rooke & Co., 184, 5 Chome, Nakanoshima, Osaka.

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THE
Tramway and Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
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SATURDAY, FEBRUARY 28, 1914.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

WAGES, COAL AND FARES.

A remarkable parallel exists between the financial position in which many of the railway companies of this country find themselves and that which characterises a large proportion of British tramway undertakings. At the annual meetings of the railway companies which are now being held, certain features have been common to the statements made by many of the chairmen. They have told a tale of abounding gross revenue, in many cases all previous records having been beaten, but they have also shown that the expenses for wages have risen enormously. The fixing of railway servants' wages is now practically out of the power of the companies, owing to the conciliation boards scheme which was practically forced upon them by the Government, and a new scheme is to be negotiated which will probably be still more favourable to the employees. There is no prospect of rates of wages decreasing; rather they will increase, and all the new facilities for raising rates on goods are likely to be required. The railway companies have also reported huge increases in their coal bills. It is probable that as the trade boom slackens the price of coal will also fall somewhat, but it is never likely to reach the low figures of some years ago, as miners' wages are evidently on a permanently higher plane. The partial remedy of raising goods rates is not of much use in the case of city and suburban railways, whose business is mostly confined to passenger traffic. Mr. Roger T. Smith, in a paper recently read to the Institution of Electrical Engineers, has pointed out that the obstacle in the way of electrifying city and suburban railways is mainly a financial one. The capitalisation of such lines is necessarily high, and to increase it by conversion to electric traction, he thinks, can be justified in many cases only by increased fares or by obtaining electricity for working at a much lower cost per unit than anything hitherto known. Turning to tramways, the financial year in many cases does not expire until March 31, but in the case of those which closed their year on December 31, we already have instances of increased traffic receipts and practically corresponding increases in working expenses. Here, again, the offending items are wages and coal. Though no Government pressure is brought to bear on the owners of tramways to raise wages, a large number of undertakings (especially among those belonging to municipalities) have during the past year continued the process of granting increases. As to coal, those undertakings owning their own power stations have felt the pinch, while in some cases where energy is purchased it is possible that the price charged per unit may have to be raised. In regard to tramways whose financial year ends on March 31, the traffic receipts to date show in most cases (outside of the metropolitan area wherein omnibus competition prevails) substantial percentages of increase compared with the previous year. The great activity in trade has been felt all round. It can hardly be doubted, however, that when the accounts are issued it will be found that the working expenses have risen materially. As the tendency to increase wages, particularly in the case of the municipal undertakings, will continue, it is plain that something will have to be done to maintain the tramway business in a prosperous condition. As in the case of the city and suburban railways, it will, perhaps, be found before long that the remedy to meet the high cost of wages and of coal is to raise the fares slightly above the ridiculously low figures which in so many cases now obtain. Already there are signs at some places in the country that a halt is about to be called in the way of concessions in fares and that the next movement will have to be in the opposite direction. Speaking generally, it may be affirmed that the capitalisation of a tramway per mile is as high in proportion to its earning power at present fares as is that of a city and suburban railway; the same trouble affects both. It seems, therefore, only a question of time when fare revision will have to be taken in hand. It would mean very little to the public, but it would mean a great deal to the tramways.

PERTH ADOPTS SEASON TICKETS.

Probably there is no subject that has agitated new members of local authorities and of tramways committees more than the desirability of issuing season tickets. The argument advanced in support of such tickets is that regular riders and the conductors will be saved trouble. The achievement of that result is, however, not so certain. In large cities few passengers from a suburb will care to travel to take up tickets at the offices situated in another part of the central business locality in which they are engaged. Again, there must be a substantial reduction in the charge made for the season ticket, yet if this is done an agitation is sure to arise against it from persons who cannot afford to pay down in one sum the yearly cost of their travelling. These persons are so numerous that they can influence a considerable number of the members of a local authority. Then clerks must be set apart for the issue of the tickets, and unless the owners of the tramway desire to open the door for the use of the tickets by persons other than the rightful holder, arrangements must be made for photographing them and affixing a copy of the picture to the pass. The amount

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of trouble occasioned by persons claiming to be season ticket holders on the railways is shown by numerous police court cases which arise notwithstanding that a large staff of travelling ticket inspectors is engaged. Nor does such trouble emanate from railway season ticket holders only. At Aberdeen composition tickets have remained as a relic since the city took over the cars in 1898, although Mr. Pilcher, the manager, has declared that they do not pay from the Corporation's point of view. Passengers manifest a reluctance to produce them, and many continue to use them after their availability has expired. Trouble is also occasioned by requests for extensions on account of holidays, illness, or some other reason. Furthermore, he says, passengers sometimes do not hesitate to go beyond the points for which the tickets have been issued. The trouble which is caused to the officials may be gathered when it is mentioned that last year 3,100 tickets were held by adults and 880 by children, the revenue obtained amounting to £3,280. Owing to the reduction of fares and the extension of penny and halfpenny distances during late years, season tickets are declining. Not very many years should elapse before the Tramway Committee find themselves in the position recently occupied by the Southport Corporation, namely, of avoiding further trouble by abolishing contract tickets. When, at a recent meeting of the Perth Corporation, season tickets were adopted, it was pointed out that no tramway system in Britain issued them. Thereupon a valiant ex-bailie asked why Perth should not give a lead. To the aforementioned reasons against that course we may add a conclusion arrived at by Mr. Mallins, the manager of the Liverpool tramways, in a report which he prepared on the subject for his Committee towards the end of 1913. He communicated with the authorities of the principal municipal tramways, and received replies from eighty-four. None of these undertakings, with the exception of three, issues contracts, and all consider they are impracticable, owing to the fact that it would be difficult, if not impossible, to appraise the correct value of a contract on any large tramway system, and further, that it would be quite impossible so to check such a system as to effectually prevent abuse. In one of the three undertakings where contracts have been introduced, the corporation found it necessary to discontinue the use of contracts at the end of last year owing to the manner in which they were abused and the consequent serious financial loss to the corporation. In another case it is estimated that the corporation are losing at least £1,500 per annum.

LONDON UNDERGROUND ELECTRIC RAILWAYS.

MAGNITUDE OF THE CONTRIBUTIONS FROM THE OMNIBUS SECTION.

The accounts of the Underground Electric Railways Company of London for 1913 show a divisible balance of £623,838. Interest on the 4½ per cent. 1933 bonds absorbs £84,488, Central London Railway assented stocks £26,830, 6 per cent. first cumulative income debenture stock £76,380, and 6 per cent. income bonds £390,970, leaving £45,170, which it is proposed to carry forward. For the first time the accounts cover a complete year's working. Of a total income of £629,817 only £153,649 was received from the interest in railway companies proper, the principal contributor to the revenue being the holding in the London General Omnibus Company, which yielded £207,086. A sum of £170,000 was derived from the Associated Equipment Company, which was brought into existence to carry out the constructional work necessitated by the omnibus company's rapidly expanding enterprise. With the balance of £2,996 from the previous account added, the total income at the disposal of the directors is £632,813. The various interest payments already announced, the sum of £26,830 paid under guarantee on Central London Railway Assented stocks, and income-tax require altogether £578,669. A further £8,974 went in general expenses, and there remains the substantially increased sum of £45,169 to be carried forward. The holding of stocks, shares, and other property stands in the balance-sheet at £13,593,696, and there is an item of £474,000 for commission and discount on issue of bonds which in due course will have to be provided for. The report says:—"The business of the London General Omnibus Company, Limited, continues to expand. The fleet of motor omnibuses was increased during the year and several new garages were opened. The Associated Equipment Company, Limited, entered into an agreement with the Daimler Company, Limited, whereby this company has been appointed the sole manufacturer for the Daimler Company of certain classes of commercial motor chassis. This company, in addition, will continue to manufacture chassis and spare parts for the London General Omnibus Company. In October last the company entered into an agreement with the New Central Omnibus Company for the purchase of its assets. In accordance with the arrangement set forth in the last report, the exchange of the shares formerly held by this company in the London United Tramways, Limited, for shares in the London and Suburban Traction Company, Limited, was duly carried out. The results of the latter company for its first year may be considered as satisfactory."

ACCIDENTS TO TRAMCARS.

RUNAWAY CAR AT ROCHDALE.

A Board of Trade inquiry was held on February 23 at Rochdale by Colonel Druitt into the accident with a single-deck car on February 14 on the John Street section of the Rochdale and Whitworth route, when 18 passengers and the driver were injured. The Town Clerk spoke with admiration of the pluck and courage displayed by the driver of the car, Harry Sansom, and said that as an ex-Navy man he had displayed traits of courage that were characteristic of the service. There were, he pointed out, steeper gradients than John Street. This was the first accident on the gradient. Mr. G. Webster, the general manager, and Mr. E. Sedgwick, rolling stock superintendent, gave evidence of the damage to the car, and that the position of the lever indicated that the hand brake had been applied to its fullest extent. Mr. Sedgwick assumed from that fact that the wheels had been locked by the application of that brake. The rails at the time were very greasy. Mr. Webster said the controller was lying flat on the platform. The reversing handle was in the reverse position, and the main power handle was on the seventh notch of power. The sanders were in good working order, and there was plenty of sand in the hoppers. There were two compulsory stops for the descending journey, and the speed allowed was six miles an hour and four miles per hour round the curve at the bottom. Motorman Sansom commenced his duties as a motorman with the Rochdale Corporation in July, 1913.—Colonel Druitt: The presumption is that he thought the brakes had failed, and then as a last resort he tried to reverse the car?—Mr. Webber: Yes. The sand used was a mixture of three-parts sand to one part of clinker. There had been no complaints about the present mixture.—The conductor gave evidence that the customary stop was made at the top before making the descent, but shortly after entering the street the car got out of control and rushed down until it came into contact with the electric standard.—The secretary to the employees' union alleged that the sand was not satisfactory, that it was mixed with clinkers, and was used on the ground of economy. This particular kind of sand would not drop in sufficient quantities. The men had never been satisfied with the sander, and thought it was an important factor in that kind of accident. What was essential was a continuous sander, with an unlimited supply of sand. The present manager had promised to change the type of sander, and the men were convinced that would have been done even if there had been no accident.—Colonel Druitt adjourned the inquiry until the motorman is in a condition to make a statement.

CARS OVERTURNED AT MANCHESTER AND LONDON.

On February 25 while a car from Slade Lane was turning the corner of High Street, Chorlton-on-Medlock, it left the metals, dashed across the road on to the pavement, and overturned. Many of the thirty passengers sustained cuts from the broken windows, and one man had a leg broken. The motorman has admitted that he was driving too fast. This is the first serious accident during the thirteen years' existence of the electric tramways.

At 1 a.m. on February 25 a London County Council empty car left the line at a curve when about to enter the Agincourt Road depôt, Hampstead, demolished a wall and overturned. The driver and conductor were injured.

INQUIRY INTO THE HARRINGAY ACCIDENT

An inquest was held on February 21 at Tottenham on the body of Herbert Stringer, a motorman, employed by the Metropolitan Electric Tramways Company, who died as the result of injuries sustained in leaping from his car, which had run away on the gradient between Manor House and Harringay Bridge. Just after he leaped off the car collided with one in front, and the platform and staircase were demolished.—Mr. D. F. Adamson, brake specialist, of the Tramways Company's staff, said he found the hand brake in perfect order. A possible theory to account for the accident was found in regard to the electric brake. One of the cables had an abrasion, so that it was not properly insulated. Possibly it was intermittently touched by the controller case, and the effect would be to cut off the electric power and throw the brake out of action. This would only have been for the first time after leaving Manor House.—Chief Inspector Bassom, superintendent of the Public Carriage Department, Scotland Yard, said his theory was that the driver allowed too much speed on the car at the top of the hill, and, on applying the brake suddenly, the wheels skidded and carried the car down the hill.—The jury returned a verdict of death by misadventure, and suggested that the cars should be inspected more than once a year.

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MISCELLANEOUS NEWS AND NOTES.

Charge for Power to Croydon Tramways.—For all current beyond two million units per year the tramways department are now to pay ¾d. per unit.

Suggested Extensions at Dundee.—Schemes of tramway extension at an estimated cost of £8,000 are under the consideration of the tramways manager.

Edinburgh Parcel System.—On account of the increase of the parcels traffic on the Edinburgh tramways separate vehicles are being used as parcel conveyances.

Hudson and Bowring, Limited, have removed to larger premises. Their address is now Reliance Engineering Works, Thornton Street, Rochdale Road, Manchester.

Huddersfield Extensions.—After the track on the Outlane, Fartown, Longwood, and Leeds Road sections has been doubled, the Greetland and Marsden extensions are to be made.

First-Class Cars for a Birmingham Suburb.—February 25 was the date of the opening of the first-class tramcar service on the Hagley Road route, double fare being charged for the seats in the lower saloon only.

Additional Plant at Chesterfield.—At an estimated cost of £15,000 additional plant is to be installed at the Corporation electricity works, subject to the Local Government Board granting the necessary loan.

Nottingham and Blind Passengers.—The Tramways Committee have agreed to consider a proposal for carrying poor blind persons free of charge. Thirty-two tramway undertakings have granted this concession.

Charge for Current at Plymouth.—The Electricity Committee have decided to charge the Tramways Committee 1⅜d. per unit for the first 350,000 units, and 1½d. per unit afterwards, a reduction representing a saving of £420 per annum.

Ten Extra Cars for Huddersfield.—The Tramways Committee have been authorised to order ten more cars. Thirty cars still with uncovered tops are to be covered. Tenders will be invited for the work if the tramways department cannot undertake it.

Board of Trade Recommend Side Guards.—Coventry Council have received the sanction of the Board of Trade to the borrowing of £10,000, repayable in 15 years, for the purchase of 10 new cars, the Board stating that the cars should be provided with side guards.

Proposed Abolition of Halfpenny Fares.—In consequence of the unsatisfactory state of the finances of the Stalybridge Joint Tramways Board, it is proposed to discontinue halfpenny fares. A resolution of protest has been passed by the Trades and Labour Council.

Special Cars for Blackpool Excursion Traffic.—So successful have been the toast-rack cars on the five-mile circular tour, for which fourpence is charged, that the Tramways Committee have decided to acquire six more toast-rack cars, and there will then be available 24 of this type.

More Cars Needed at Hull.—On the recommendation of the manager that 20 new cars be obtained, the Tramways Committee have directed the city engineer and the manager to make inquiries as to the best type of car on the market, inspect the same, and report further to the committee.

Home Secretary and the Hatpin Danger.—In reply to a question in the House of Commons on February 22, the Home Secretary said if unprotected hatpins could be shown to be a public danger, the local authorities might deal with it in their Bills, and in the case of tramways it could be dealt with under the Tramways Act.

More Cars for Kirkcaldy.—In consequence of the great growth of traffic—over half a million extra passengers having been carried in nine months—specifications are being prepared for a number of new tramcars. Councillor Ferguson, the convener of the Tramways Committee, says it is hoped to provide protection for the motormen on the new cars.

West Bromwich and Railless Trolley Traction.—A deputation from West Bromwich Council have inspected the installation of railless trolley cars in the Welsh mining district of Aberdare. The visitors received a very favourable impression, which should assist the Highways Committee in arriving at a decision as to the system to be adopted for West Bromwich.

Third-Party Insurance at Glasgow.—The contract protecting the tramways department against third-party risks expires at the end of May, and the Tramways Committee are asking offers for insurance for another period of years. The premium paid for the year which ended May 31, 1913, amounted to £26,538, while that for the previous year was £27,068, the sum varying according to the car mileage run.

Books of Transfer Tickets Discarded.—Preston Tramways Committee have decided that transfer tickets shall only be issued singly, in consequence of some passengers having declined to tear out the tickets from the books in which they have hitherto been sold. The Town Council are to be asked to sanction a resolution that in future goods for the penny parcel delivery shall only be accepted at the recognised stopping places.

Omnibuses for Aberdeen Suburban Tramways Company.—The half-yearly report of this company shows a profit of £1,484, making with the amount brought forward £2,453, which, as usual at this time, is carried forward. The directors have placed an order for three motor omnibuses, which they hope to have in operation within the next few months. They have also given an order for a new car. A new agreement has now been concluded with the Corporation of Aberdeen for the supply of electric energy to the company at a price of 1⅜d. per unit, being a reduction of ⅜d. per unit from the present price.

The Institution of Automobile Engineers.—The next meeting will be held on Wednesday, March 11, in the Institution of Mechanical Engineers, Storey's Gate, S.W., at 8 p.m., when Mr. F. W. Lanchester will read a paper on "Engine Balancing." Cards of invitation may be obtained on application to the Secretary, 13, Queen Anne's Gate, Westminster. The meeting will be preceded at 7.45 by the annual general meeting.

Condition of a Track for Inter-Running.—The manager of the Erith Council's tramways has communicated with the manager of the Bexley system with reference to the damage sustained to the Council's cars due to the bad state of the track. A letter received from the Bexley manager states that the question was receiving his serious consideration, and that extensive repairs to the track would be carried out in the near future.

Birkenhead Extension Inquiry.—Mr. Cyril Clark, the tramways manager, was one of the witnesses called by the Corporation at the inquiry which was held into the application for the extension of the borough boundaries. He said there had been requests that the tramways should be extended towards Port Sunlight and to Browborough. Replying to a question he was unable to say what motor omnibus service would be given to Higher Bebington.

Traffic for the Slack Hours at Manchester.—A sub-committee of the City Council has been formed, consisting of representatives of the Parks, Tramways, and Education Committees, for the purpose of discussing the question of facilities for taking the scholars to the parks during the summer holidays. It is suggested that the children should be taken out at 2 a.m. and brought back at five o'clock. Whether they will ride free of charge is a matter not yet decided.

Sunday Car Service.—Warrington Council have agreed to a curtailment of the tramway service in order to give the employees one Sunday off duty in four. The Mayor said if in a great city like Bradford the Sunday service did not start until 2 p.m., and gave satisfaction to the public, the people of Warrington would not be in such great difficulties over the proposal. He would support a half-day service. Dr. Joseph said a half-day service was proposed, but was rejected by the Committee.

Breast and Arm Stripes.—As a number of the Bournemouth employees are entitled to wear a fourth stripe on the arm the tramways manager has secured sanction to a broad stripe being worn on the breast of the tunic. This stripe will be equivalent to four on the arm, and will gain for its wearers an extra 6d. per week. The stripes on the arm would continue until three more were earned, and on the fourth one again becoming due a second stripe to be added to the breast and similar treatment meted out for this second stripe.

Requirements at Newcastle-on-Tyne.—The estimated expenditure out of the Corporation tramways reserve and renewals fund during the year to end March 31, 1915, is £34,250, including the following items:—Alterations to cars, £6,000; new pipe line, values, etc., at pumping station, £2,500; removing centre poles and provision of new poles, £3,200; water softener for power station, £400; repairs to No. 2 pump, power station, £400; additional turbine, £9,200; additional rotary converter, etc., £2,550. The income is estimated at £255,150, and the expenditure £144,000.

Rate and Labour Demands on Newcastle Tramway Earnings.—In order to avoid an increase of the city rates the Tramways Committee have agreed to contribute £6,000 from the profits in addition to £12,000 already offered. On February 21 the tramway union employees drew up a programme for increased pay to all grades, a minimum wage of 26s. to all employees over the age of 21, double time for Christmas and New Year's Day; time and a half for three days at race week; and time and a half for all "days-off" which are cancelled and to any man who works his day off at the request of the management.

Light Railway Inquiry at York.—Schemes to extend the tramways from Nessgate to Hull Road, and from Haxby Road to Yearsley Baths, were inquired into by the Light Railway Commissioners on February 25. In regard to the application for powers to charge increased fares, Mr. J. W. Hame, the tramways engineer, explained that the powers were intended to meet race-days and special occasions like the Yorkshire Show. Colonel Boughey, one of the Commissioners, said he thought it better to limit the power to a maximum number of race days and two or three other days, and not allow the fares to be raised promiscuously.

A Railway Chairman and West Ham Tramways.—At the annual meeting of the Great Eastern Railway Company, Lord C. Hamilton, the chairman, complained of tramway and motor competition at West Ham, and said the borough has "a tramway system which had proved totally unremunerative," and that "a proposal was to be submitted to the Council for the sale of those tramways." Alderman H. W. Littler, chairman of the Tramways Committee, states that the system had returned to the rates profits totalling £35,784, and paid £74,000 for street widenings. A deficit of £3,388 last year was wholly caused by the unfair competition of the motor omnibuses.

Railless Traction at Ramsbottom.—Mention was made at the February meeting of Ramsbottom Council to the inauguration of the railless trolley traction system. The estimated total capital expenditure, the chairman (Councillor Harrison) said, was £13,350. This was £3,000 more than the original estimate, but instead of three cars they would have six and a car shed. They required an average income of £67 per week to make the system pay. It seemed impossible at present to estimate the receipts, but the committee were prepared for a loss of £300 on the year. When the two new cars were ready to deal with the traffic they were confident that the receipts would not fall far short of the amount required.

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Question of a Four Hundred Yards' Extension at Cardiff.—Before deciding whether to extend the tramways 400 yards to Llandaff Field Gates the committee have agreed to await the result of the present year's trading. Mr. A. Ellis, the engineer, and Sir John Courtis, the chairman, doubt whether the public would be prepared to pay an additional halfpenny for so short a ride. Mr. Ellis suggested that if the track was to be extended at all it might be carried out and into the Llandaff district, thus picking up additional passengers who would be prepared to pay an additional fare. It may be mentioned that when the London lines were extended over Westminster and Blackfriars Bridges the County Council speedily abandoned the attempt to charge an additional halfpenny.

Generating Cost and Further Electrification of the Lancashire and Yorkshire Railway.—Sir George Armytage, chairman of the Lancashire and Yorkshire Railway, stated at the annual meeting on February 18 that the largest item of expenditure during the year was a sum of £125,000 for a new electric power station at Clifton Junction. The electric power and light account was very interesting, and from the small cost of generating he thought it showed the expediency of their policy in making their own electric power. The directors proposed to electrify the existing lines from Manchester, through Crumpsall, to Bury, and they had little doubt, judging from their experience in the neighbourhood of Liverpool, that they would obtain an additional traffic that would well justify the expenditure.

Two Views of Lost Ticket Cases.—At Tower Bridge police court recently in a summons against a tramcar passenger for failing to deliver up his ticket or pay the fare, a representative of the London County Council said it had been decided that if a passenger had lost the ticket his remedy was to recover the amount. In ordering the defendant to pay 3d. and 2s. costs, the magistrate said, "I am sorry the Council have brought you here. There is something a little harsh about it." In a similar summons at Cardiff the stipendiary magistrate remarked that it would be easy for dishonest people to say, "I have paid my fare and lost my ticket." What would be the result to the Corporation? The cars would be run at a loss, and the ratepayers would have to suffer. He imposed a fine of 10s. and costs, or fourteen days.

Engineers' Visit to Manchester.—At the annual meeting of the Institution of Municipal and County Engineers at Manchester on February 20, the visitors were entertained at luncheon by the Tramways and Improvements Committees, Alderman Bowes, chairman of the first-named committee, presiding. Mr. J. A. Brodie, city engineer, Liverpool, moved a vote of thanks to their hosts for the hearty reception. In an allusion to tramways, Mr. Brodie said there was no doubt that we were on the eve of very great improvements in connection with the different forms of communication between the centre and outskirts of our great cities. Whether it was by means of tramways or motor vehicles, people in the large towns must be conveyed much more quickly than at present between the centre of the town and the suburbs. The chairman, in his reply, said the Tramways Committee were doing their best for the citizens. He paid a high tribute to Mr. McElroy, the tramways manager, and said they were in the happy position of being at the top of the tree among all the Corporations of the country in respect of their tramway results. They were handing over approximately £100,000 a year in profits, which meant a sixpenny rate to the city. They also had a reserve fund of £470,000. In responding to one of the toasts, Mr. McElroy touched on the question of future means of transport in great cities, and remarked that that was a matter which would have to be gone into with the aid of municipal engineers.

CONTRACTS AND ORDERS.

Huddersfield Council have allotted to the Glasgow Railway Engineering Company a contract for the supply of steel tires and tramcar wheels.

Great Yarmouth Council, out of twelve tenders received, have accepted that of the Brush Electrical Engineering Company for the supply of 600 kw. turbo-alternator, at £3,358.

Blackpool Council have placed a contract for new uniforms for the tramway employees with Messrs. Briggs, Jones and Gibson; for caps with Donnelly and Sons; and for straw hats with Mr. J. Anderson.

Aberdare Council have accepted the tender of the Brush Electrical Engineering Company for the supply and delivery of four double-deck tramcars, without top covers, at £2,850. With top covers the tender of the Brush Company was £3,346.

The J. G. Brill Company have an order from Blackpool Corporation Tramways for one of the Brill patented radial axle trucks. Other important tramways have placed orders for the "Radiax" truck, which was described in our issue of December 11, 1913, and is so designed as to permit radiation and secure the stability of the car on straight track.

The General Electric Company, Limited, through their China company—the General Electric Company of China, Limited—have secured for the third time the contract for "Osram" traction lamps, from the Shanghai Tramways (International Settlement). The General Electric Company of China report that the Osram lamp is giving unqualified satisfaction in that country.

Chesterfield Omnibus Services.—The Council have accepted the tender of Mr. J. W. Wildgoose at £321 for an extension of the car shed, and at £464 for roofing the omnibus garage. The omnibus service is to be started during April, and upon the financial result will depend the decision of the Tramways Committee as to what routes are to be selected for railless trolley car traction.

PERSONAL.

Mr. R. F. Dixon, of Hull Corporation tramways, has been chosen from ninety-one applicants for appointment by Southampton Council to the post of works superintendent in the tramways department.

Mr. J. Brown, on leaving Doncaster Corporation tramways to become traffic manager to the Ayr Council tramways, has been presented with a marble clock and a pair of bronzes by the tramways and electricity departments. Mr. E. S. Rayner, borough electrical engineer and tramways manager, made the presentation.

Mr. E. J. Neachall, engineer and general manager of Liverpool Overhead Railway, at the annual meeting of the company was praised by Mr. H. C. Woodward, the chairman, for the capacity, industry, and energy he had displayed during the past year. Praise was also accorded to his assistants, Messrs. Hughes and Fox, for their able work.

Sir George White, chairman of the Bristol Tramways and Carriage Company, in acknowledging the confidence of the shareholders in re-electing him as a director, said he could only say that these were anxious times for their directors. The whole situation was full of complications, and a very difficult one to deal with. They might rely upon him to continue to devote all his energy and thought to the business of the company, and particularly in the approaching difficult time to defend the shareholders' interests.

Mr. J. Robertson and **Mr. P. Fisher,** respectively burgh electrical engineer of Greenock, and general manager and engineer of Dundee tramways, have presented to Stirling Council their report on the offer made by Mr. George Balfour for the purchase of the electricity undertaking and the electrification of the tramways. Messrs. Robertson and Fisher set forth their opinion that there was no reason why the Council should not lay down and operate the tramways quite as successfully as a company could do. The Council have asked the two consultants to report further.

L.C.C. Tramway Officers' Salaries.—At last Tuesday's meeting of London County Council the Highways Committee on the occasion of the annual revision of salaries recommended the following increases:—Mr. J. Welling, permanent way engineer in the tramway department, from £575 to £600 a year; Mr. A. R. Owen, tramway and marine claims superintendent, from £500 to £550 a year; Mr. W. E. Ireland, rolling stock superintendent in the tramway department, from £500 to £525 a year. It was also proposed that an assistant rolling stock superintendent should be appointed, and that Mr. H. S. May, first-class assistant, be promoted to the post with an increase of salary from £300 to £325 a year. The recommendations were approved.

Mr. H. W. Laing, general manager, Blackpool, St. Annes, and Lytham Tramways Company, was complimented upon his good record by Mr. C. E. Riding, the secretary, at the annual dinner of the employees. Mr. Laing's work, he said, was shown in the good fellowship and loyalty of the staff, in which the directors and himself for that reason took a pride. Mr. Preston, a new director, remarked that he had been on many boards, but the one in connection with that company—including Mr. Nicholson, Mr. Smith, and the officials—was the best he had ever had to work with. Mr. Laing thanked the directors for granting the men a week's holiday with pay, and congratulated the motormen on another record year, so that for the past three years they had headed the list for running on the least consumption of electric current in the country.

Mr. Stephen Sellon, engineer to the Dearne Valley light railway scheme, which is being promoted by a number of local authorities in the colliery district of South Yorkshire, addressed a large meeting held in support of the project at Wath. He said there was a certain amount of opposition that would simmer down, because there was no real backbone in it. He had constructed about 800 miles of tramways, and knew what they cost, and he had been the engineer to many undertakings, and therefore knew what such schemes were likely to do; but he was told that he knew nothing about the business. A halfpenny per mile rate would be charged to workmen in the early morning and evening, and at noon on Saturdays, and that, he ventured to say, they would not get from an omnibus company. A resolution in favour of the scheme was carried by a three-fourths majority.

FINANCIAL REPORTS AND MEETINGS.

Waste Heat and Gas Electrical Generating Stations Company.—The net profits for the past year were £38,245, and £8,965 was brought forward. A final dividend of 5½ per cent. is proposed, making 8 per cent. for the twelve months, adding £9,500 to the reserve, and carrying forward £12,110.

Wemyss and District Tramway Company.—The accounts for the past year show a profit of £4,351. The directors propose to write off £500 to betterment, to add £1,306 to depreciation reserve fund, to pay a dividend of 7½ per cent. on the ordinary shares, and to carry forward £1,072. The cumulative preference shares for the first time receive 7½ per cent.

Walsall Corporation Tramways.—The statement of accounts for 1913 shows that the number of passengers carried was 6,121,381, and the revenue was £33,073, being at the rate of 11.234d. per car mile run. The working expenses were at the rate of 7.209d. per car mile, and amounted to £21,607. After meeting interest on loans and sinking fund there remained £4,348 for appropriation. Of this, £368 is devoted to cost of alterations and extensions at the depôt; £1,500 to alterations and extensions at the central tramway offices, and £1,000 contributed in aid of the rates for 1013. Of the net balance of £1,480, it is proposed to contribute a further £1,000 to the rates, and to utilise the remaining £480 in providing new brakes for cars. The reserve fund amounts to £33,873.

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Great Orme Tramways Company.—The receipts for 1913 amounted to £2,898, and the profits £1,342, while £856 was brought forward. After providing for interest charges the surplus is £1,980. The directors propose to appropriate £1,000 for depreciation, and to carry forward £980.

The British Electrical Federation.—The traffic statement for the week ended February 20, 1914, shows that the receipts from tramways and railways amounted to £38,136, as compared with £34,590 in the corresponding week last year, and from omnibuses £12,164, as compared with £2,260, making a total of £50,300, as compared with £36,850. The tramway and railway route mileage was 420.82, as compared with 428.47. Upon such of the services as were working both last year and this year the receipts show an increase of £3,391 upon the week.

Leicester Corporation Tramways.—The report and accounts for 1913 were presented to the Council on February 24. The net revenue for the year amounted to £32,501, of which £12,453 has been contributed to the sinking fund and £6,059 expended during the year on the Humberstone Road widening, motor lorry, new canopy cars, arrears of income-tax, etc. It is recommended that the balance of revenue on December 31 last (£13,988) shall be appropriated as follows:—New canopy cars, £339; ten canopy tops for cars, £707; Leadenhall Street property, £999; new engine bed, £400; power supply purposes, £1,552; relief of borough rates, £10,000.

Paisley District Tramways.—The eighteenth ordinary general meeting was held on February 19. Mr. Owen H. Smith, who presided, said that, although partly due to an additional service of cars and an increase in the local rates, the increase in expenses was mainly owing to increased cost for the maintenance of the track and roadway, due to damage caused by the increasing heavy traffic of motor lorries and other heavy vehicles. This matter was receiving the attention of the directors. A dividend on the ordinary shares was paid for the first six months at the rate of 2 per cent., but owing to this heavy expenditure they thought it advisable not to pay any further amount this year.

Record Year for Torquay Tramways Company.—Mr. L. B. Schlesinger, who presided at the annual meeting of the Torquay Tramways Company, observed that the results for 1913 were in every way satisfactory. When they met in February of last year to receive the accounts and declare a dividend of three per cent. on the ordinary capital for 1912, he indicated that the shareholders could look forward to improved results. He did not then anticipate that there would be such a substantial improvement as the accounts disclosed. The directors recommended now a dividend of five per cent. on the ordinary shares and the placing of the substantial amount of £2,500 to reserve and renewals. A bonus of £196 was granted to the staff. During the holiday season the staff were working at high pressure, but the work was cheerfully done without demur. The use of car meters had reduced the current consumption, and had also a desirable effect on the repairs and maintenance of the cars, due to more careful driving, and to the fact that defects were promptly detected.

Mansfield Tramways Company.—Mr. A. H. Holland, the chairman, moved the adoption of the report at the annual meeting held at Mansfield on February 16. He said that after spending on repair and maintenance account over £2,500, or a sum in excess of what had ever been spent before, and after placing £1,400 to the depreciation fund, they had decided, as the year had been a good one, that it would be wise to place a sum of £1,000 to the renewals account. After recommending a dividend of 5½ per cent. on the ordinary shares, or ½ per cent. more than on the last occasion, they were able to carry forward £1,400 to the new account. This had been the busiest year the company had ever had, and developments were taking place in several directions. For some time past the directors had had under consideration whether the time was not getting ripe for them to endeavour to give increased facilities of locomotion between some of these fast developing areas and the town of Mansfield. A vote of thanks was accorded to Mr. C. R. Walker and his staff, the chairman describing Mr. Walker as an excellent manager.

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WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended February 21 amounted to £222,347, or £18,188 more than in the corresponding week last year, while the track mileage was 2,863, or 24 more than for the corresponding week. The receipts were at the rate of £77 13s. 3d. per track mile, an increase of £5 15s. 1d. per mile as compared with last year.

COPPER AND ALUMINIUM MARKET.

February 27, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton:—

	Friday, February 27.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	64 5 0	64 17 6	64 12 6
,, ,, (three months)	64 15 0	65 10 0	64 12 6
Electrolytic Copper—bars or ingots	67 5 0	68 0 0	68 10 0
Aluminium—bars or ingots	83 0 0	83 0 0	87 0 0

COAL MARKET.

February 27, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows:—

	Friday, February 27.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	s. d.
Best Admiralty Welsh (large)	23 6	23 6	24 3	
Best Seconds	23 0	23 3	24 0	
Ordinary Drys	21 6	21 9	22 6	
Best Washed Nuts	21 0	21 0	21 6	
Best Washed Peas	19 6	19 6	20 0	
Cardiff, f.o.b.—				
Best Admiralty (large)	19 0	19 0	19 3	
Best Seconds	18 6	18 9	19 0	
Ordinary Drys	17 0	17 3	17 6	
Best Washed Nuts	16 6	16 6	16 6	
Best Washed Peas	15 0	15 0	15 0	
Newcastle, f.o.b.—				
Best Steams	13 9	13 9	15 0	
Best Seconds	11 9	11 9	14 6	
Smalls	6 9	6 9	10 9	

Owing to the miner's strike there were no quotations.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregate. Wks.	Aggregate. 1913-4.	Aggregate. Increase or Dec.
Anglo-Argentine	Feb. 18	£55,252	£55,561	7	£395,603	+ £16,070
Auckland (28 days)	Jan. 16	21,653	25,633	29	135,538	— 3,874
Ballarat and Bendigo	Dec.	3,863	3,850	38	34,575	— 724
Brazilian St. Rly. Mirs	Jan.	46,268	54,689	26	319,153	+ 54,032
Brazilian Traction	Feb. 21	88,867	96,639	8	757,320	+ 59,066
Brisbane	Jan.	24,810	28,330	4	28,350	+ 3,520
British Columbia $	Jan.	743,271	777,102	31	5,330,828	+ 336,733
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacroze	Jan.	44,601	43,651	30	316,546	+ 8,287
Calcutta Rs.	Feb. 21	62,254	66,874	8	5,47,244	+ 25,460
Cape Town	Jan.	...	14,646	...	...	...
Carthagena & Herrerias	Jan.	3,324	2,776	4	2,776	— 548
Cordoba	Dec.	12,266	12,863	39	120,313	+ 11,061
East India	Jan.	1,850	1,938	26	11,817	+ 487
Kalgoorlie	Dec.	3,206	2,907	52	34,510	— 8,300
La Plata	Jan.	5,575	5,296	4	5,296	— 279
Lima	Sept.	22,660	34,110	39	300,647	+ 23,783
Lisbon Mirs.	Sept.	...	144,538	...	...	...
Madras (14 days) Rs.	Feb. 15	25,388	28,738	6	86,577	+ 8,369
Melbourne	Dec.	...	69,000	...	...	...
Mexico $	Jan.	561,635	579,361	4	285,348	— 6,028
Montevideo	Jan.	38 061	38,256	13	102,095	— 72
Para	Feb. 22	4,229	3,648	12	40.926	— 8,266
Port Elizabeth	Jan.	...	19,476	...	...	...
Shanghai $	Feb. 18	19,332	23,600	6	168,800	+ 30,558
Singapore $	Feb. 21	12,360	12,008	8	96,501	+ 5,471
Toronto $	Jan	776,928	847,945	4	847,945	+ 71.017
Winnipeg $	Jan.	351,497	382,670	4	382.670	+ 31,173

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1913-4.	Increase or Dec.
Aberdeen Corporation..	Feb. 18	£1,339	£1,431	+ £92	38	£61,109	+ £3,400
Accrington Corp.....	,, 11	539	559	+ 20	45	25,964	+ 2,243
Ayr Corporation	,, 21	183	239	+ 56	40	15,081	+ 2,171
Bath Electric	,, 18	716	729	+ 13	7	4,860	— 105
Birkenhead Corp.	,, 22	1,074	1,197	+ 123	47	60,578	+ 5,527
Birmingham Corp.	,, 21	11,151	12,568	+ 1,417	47	559,812	+ 47,016
Blackburn Corporation	,, 18	1,058	1,166	+ 108	47	60,907	+ 4,994
Blackpool Corporation	,, 19	446	566	+ 120	46	80,735	+ 12,525
Bolton Corporation	,, 22	2,434	2,550	+ 116	47	128,441	+ 7,146
Bournemouth Corp.....	,, 25	1,461	1,624	+ 163	47	96,354	+ 9,695
Bradford Corporation...	,, 21	5,572	5,702	+ 130	46	277,136	+ 17,081
Brighton Corporation...	,, 22	688	784	+ 96	47	50,255	+ 2,991
Bristol	,, 20	6,125	7,519	+ 1,394	7½	53,489	+ 3,400
British Elec. Federatn.	,, 20	36,850	50,300	*	...	...	...
Burnley Corporation ...	,, 21	1,527	1,625	+ 98	47	79,703	+ 8,162
Burton-on-Trent Corp.	,, 22	244	281	+ 37	47	13,847	+ 717
Bury Corporation.....	,, 22	1,195	1,218	+ 53	47	63,103	+ 2,405
Cardiff Corporation.....	,, 7	2,473	2,590	+ 117	45	132,271	+ 11,303
Chatham and District..	,, 19	734	830	+ 96	7	5,676	— 307
Chesterfield Corp.	,, 19	229	257	+ 28	46	12,070	+ 1,312
Colne & Trawden.....	,, 21	231	248	+ 17	8	1,885	+ 93
Cork Electric.....	,, 19	393	453	+ 60	7	3 134	— 13
Croydon Corporation ...	,, 13	1,429	1,486	+ 57	45	74,730	— 6,292
Darlington Corporation	,, 21	212	248	+ 36	47	11 711	+ 1 074
Derby Corporation	,, 21	829	914	+ 155	47	45,989	+ 4,145
Dover Corporation	,, 21	177	192	+ 15	47	11,342	+ 88
Dublin & Lucan	,, 20	108	109	+ 1	7	809	— 19
Dublin United	,, 20	5,065	5,252	+ 187	8	37,496	— 2,407
Dundee City	,, 25	1,131	1,204	+ 73	41	53,573	+ 3,658
East Ham Corporation	,, 21	1,030	1,016	— 14	47	48,539	— 2,275
Exeter Corporation	,, 20	241	288	+ 47	47	15,862	+ 704
Gearless Motor 'Buses.	,, 21	...	434	...	8	3,333	...
Glasgow Corporation ...	,, 21	19,211	20,737	+ 1,526	38	775,673	+ 55,530
Glossop(U.Elec.Supply)	,, 21	114	118	+ 4	8	956	— 7
Halifax Corporation ...	,, 17	1,810	1,992	+ 182	46	97,059	+ 3,609
Hastings & District.....	,, 18	662	714	+ 52	7	4,719	— 207
Huddersfield Corp.	,, 21	1,947	2,200	+ 253	47	100,010	+ 5,146
Hull Corporation	,, 21	2,957	3,123	+ 166	47	148,813	+ 7,653
Ilford U.D.C.	,, 21	396	428	+ 32	46	21,055	— 912
Ilkeston Corporation ...	,, 25	111	122	+ 11	48	6,303	+ 880
Ipswich Corporation ...	,, 21	329	360	+ 31	47	21,178	+ 710
Isle of Thanet	,, 21	255	297	+ 42	21	6,996	+ 529
Kilmarnock Corp, ...	,, 21	154	169	+ 15	40	7,072	+ 457
Lanarkshire	,, 19	1 528	1,860	+ 352	7	13,010	+ 1,495
Lancashire United	,, 18	1,300	1,544	+ 244	7	10,730	+ 1,445
Leeds City	,, 21	7,567	7,940	+ 373	47	379,976	+ 15,743
Leicester Corporation...	,, 21	2,534	2,794	+ 260	8	20,539	+ 1,116
Leith Corporation	,, 21	614	666	+ 52	40	28,405	+ 1,333
Leyton U.D.C.	Jan. 29	1,145	1,170	+ 25	43½	58,277	— 165
Liverpool Corporation..	Feb. 21	11,575	12,381	+ 806	7	94,188	+ 4,708
Llandudno & Colwyn B.	,, 20	144	163	+ 19	13	1.776	+ 6
London County Council	,, 18	39,235	42,517	+ 3,282	45	1,953,761	+ 10,454
London Gnl. Omnibus..	,, 21	51,002	54,910	+ 3,908	8	429,124	+ 433
London United	,, 20	4 956	5,622	+ 666	8	38,769	+ 460
Lowestoft Corporation	,, 21	131	151	+ 20	20	3,748	+ 321
Maidstone Corporation	,, 19	146	170	+ 24	47	9,437	+ 619
Manchester Corp.....	,, 21	16.471	17,087	+ 616	47	822,419	+ 35,795
Met. Elec. Trys.	,, 20	8.034	8,528	+ 494	8	60,414	— 381
Nelson Corporation.....	,, 21	204	188	— 16	47	9.751	+ 519
N'castle-on-Tyne Corp.	,, 21	4,318	4,916	+ 518	47	231,307	+ 20,995
Newport (Mon.) Corp....	,, 21	680	735	+ 55	47	36,062	+ 2.517
New St. Helens & Dist...	,, 18	653	758	+ 106	34	27,545	+ 2.515
Northampton Corp	,, 20	462	544	+ 82	47	26,856	+ 1,582
Nottingham Corp.	,, 19	2,976	3.240	+ 264	46½	151,419	+ 5,730
Oldham Corporation ...	,, 22	2,067	2,132	+ 65	48	105,679	+ 7,278
Portsmouth Corp.....	,, 21	1,503	1,881	+ 378	47	105,038	+ 6.880
Preston Corporation ...	,, 11	787	837	+ 50	46	40.519	+ 2,418
Provincial	,, 21	1,459	1,603	+ 144	20	35,211	+ 1,981
Reading Corporation ...	,, 19	551	669	+ 118	46	32 388	+ 2,305
Rochdale Corporation	,, 21	1,429	1,430	+ 1	47	74,819	+ 3,101
Rotherham Corp.	,, 25	869	933	+ 64	47	47,913	+ 9,854
Salford Corporation ...	,, 23	4.743	5,125	+ 382	47	245 611	+ 11.427
Sheffield Corporation...	,, 22	6,895	7,559	+ 664	48	352,728	+ 25.699
Southampton Corp.	,, 18	1,036	1,246	+ 170	46	60.845	+ 3.235
Southend-on-Sea Corp.	,, 18	516	714	+ 198	47	43,203	+ 7.404
South Met. Trys.	,, 20	652	996	+ 344	8	7,066	+ 1,929
South Shields Corp.....	,, 21	592	687	+ 95	47	33,775	+ 3.888
Sunderland Corp.....	,, 22	1.236	1.335	+ 99	47	67,754	+ 6.128
Sunderland District ...	,, 21	488	576	+ 88	16	9 072	+ 1,043
Swindon Corporation ...	,, 18	133	158	+ 25	46	7,668	+ 410
Trys. (M.E.T.) 'Buses	,, 21	766	8,086	+ 7,320	8	59.731	...
TynesideTrys.&Tmrds	,, 18	478	489	+ 11	7	3,244	+ 122
Wallasey Corporation	,, 21	946	1,057	+ 121	47	56.722	+ 5,139
Walsall Corporation ...	,, 21	569	620	+ 51	8	4 574	+ 97
Walthamstow U.D.C....	,, 21	620	686	+ 66	47	34,786	+ 1,421
Warrington Corp	,, 19	435	443	+ 8	47	20,736	+ 411
West Ham Corporation	,, 19	2,460	2 690	+ 230	46	126,400	+ 4,014
Wigan Corporation	,, 19	1,312	1,489	+ 177	46½	69,414	+ 6,311
Wolverhampton Corp	,, 25	932	1,009	+ 77	48	51,450	+ 2,616
Yorkshire (W. Riding)	,, 22	1,285	1,458	+ 172	8	11,371	+ 914

* From such of the services as were working both last year and this year the receipts show an increase of £3,391 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London.....	Feb. 21	£5,495	£5,163	— £332	8	£41,480	— £2,781
City and South London	,, 21	3.090	2,752	— 338	8	22,876	— 1,806
Liverpool Overhead.....	,, 22	1,550	1,574	+ 24	8	13,229	+ 472
London Electric.....	,, 21	14.490	14,525	+ 35	8	117,415	— 715
Mersey	,, 21	2.257	2,267	+ 10	8	18,160	+ 34
Metropolitan	,, 25	16,025	17.686	+ 1.661	8	143,776	+ 12,195
Metropolitan District.	,, 21	13,053	13.233	+ 180	8	105.534	— 419

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TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, February 27.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	+ 1	71½ — 73¼
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	— 1/16	4 5/16 — 5 1/16
5	Do. 5½% Cum. 2nd Pref.	— 1/16	4 5/16 — 4 7/16
100	Do. 4% Deb. Stk. Red.	...	92½ — 94½
100	Do. 4½% Deb. Stk. Red.	+ ½	97 — 100
100	Do. 5% Deb. Stk. Red.	...	96½ — 98¼
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 — 106
1	Bath Electric Tramways, Lim. Pref. Ord	...	3/16 — 5/16
1	Do. 5% Cum. Pref	— 1/16	1/4 — 3/4
100	Do. 4½% 1st. Mort. Deb. Stock, Red.	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Sk.	...	85 — 87
1'	Blackpool and Fleetwood Tramroad Co.	— ½	14 — 15
	Bombay Elec. Supply and Trams. Co., Ord.	...	13½ — 14¼
10	Do. do. 6% Cum. Pref.	...	10¾ — 11¼
100	Do. do. 4½% Db. Stk Rd.	...	94½ — 96¼
$100	Brazilian Traction Light and Power Co. Lim.	— ½	89½ — 91¼
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	...	7⅜ — 8⅛
5	Do. do. 5% Cum. Pref	...	4⅞ — 5⅜
100	Do. do. 4½% 1st Deb Stock, Red.	— 1	98 — 101
10	Bristol Tramways and Carriage Co.	+ ⅛	7 — 7¼ xd
10	Do. do. 4% Cum. Pref.	...	7 — 7¼
100	Do. do. 4% Deb. Stock	...	100 — 102
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	— 1	120 — 124
100	Do. Pref. Ord. Stock	— 1	106 — 110
100	Do. 5% Cum. Perpetual Pref. Stock	...	1-3½ — 106⅛
100	Do. 4½% 1st Mort. Debs.	...	98 — 101
40	Do. 4½% Vancouver Power Debs.	...	94 — 98
100	Do. 4¾% Perpetual Cons. Deb. Stk.	+ ⅛	96 — 98
100	British Elec. Traction Co., Lim., 6% Cum. Pref.	...	90 — 93
100	Do. 7% Non-Cum. Pref.	...	57 — 60
10	Do. 6% Pref. Ord. Non-Cum.	— ⅛	16 — 18
100	Do. Deferred Ord. Stock	— ½	7 — 9
100	Do. 5% Perpetual Debenture Stock	+ ⅛	94 — 97
100	Do. 4½% Second Debenture Stock, Red	...	80 — 83
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	73 — 78
100	Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb.	...	99 — 101 xd
5	Calcutta Tramways Co., Limited, Ord.	...	6 — 6¼
5	Do do. 5% Cum. Pref.	...	5 — 5¾
100	Do. do. 4½% 1st Deb. Stock, Red.	...	96 — 99
1	Cape Electric Tramways, Ld.,	...	5/8 — 3/4
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	3 — 3¼
100	Do. 5% Debs. Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co. (1904), Lim.	— ⅛	5⅜ — 5⅝
100	Do. 4% Debenture Stock Red, 1985	...	91 — 96
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.	...	89 — 93
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	— ½	94½ — 96½
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	— 6⅞
10	Dublin United Trams. Co. (1896) Lim. Ord.	+ ⅛	— 11¼ xd
10	Do. do. 6% Pref.	+ 3/16	— 12 3/16
100	Do. do. "A" Red.	— ¼	— 80
100	Do. do. Deb. Stock "B" Red.	+ ¼	— 80
10	Gateshead & Dist Trys. Co., Ord.	...	8¾ — 9¼
10/-	Hastings & Dist. Electric Trams. Co.. Ld., Ord.	...	3/16 — 3/16
1	Do. do. 6% Cum. Pref.	...	1/2 — 3/4
100	Do. do 4½% Deb. Stk. Red.	...	67 — 72
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	93¼ — 97½
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)	...	86 — 90
10	Imperial Tramways, Ord.	...	3 — 3½
10	Do. do. 6% Cum. Pref.	...	6¼ — 6½
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.	...	2 — 2¼
100	Do. 4% Debenture Stock	...	71 — 76
1	Kalgoorlie Elec. Trams., Ltd.	...	0 — 1/16
100	Do. do. 5% "A" Deb. Stk.	...	85 — 90
100	Do. do. 6% "B" Do. do.	...	10 — 20
7/8	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.	...	3/8 — 1
10	Lanarkshire Tramways Co.	...	9¾ — 10¼
100	Lancashire United Tramways, 5% Prior Lien Deb.	...	85 — 87
1	Lisbon Electric Trams., Lim., Ord.	...	1⅛ — 1⅜
1	Do. 6% Cum. Pref.	...	1/2 — 1/16
100	Do. 5% Mort. Debs.	...	91 — 96
1	London and Suburban Trac. Co., Lim., Ord.	...	¼ — 5/16
100	London General Omnibus Company, Limited, 4½% Deb.	...	97½ — 99½
100	Do. Do 5% Cum. Inc. Deb. Stk. Red.	— 1	89 — 92
100	London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red	...	63 — 67
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref.	...	5 — 5½
5	Do. do. 5% Deb. Stk., Red.	...	101 — 103
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	79 — 82
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	...	112 — 115
$1,000	Do. do. 5% Bds.	...	98 — 100
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	— ⅛	31/32 — 1 1/32 xd
100	Metropolitan Elec. Trms. Ltd., 4½% Deb. Stock, Red.	+ 1	93 — 98
100	Do. 5% Deb. Stock, Red.	...	90 — 93
100	Mexico Tramways Co., Common Stock	— 1⅛	69 — 72
500	Do. Gen. Con. 1st Mort. Gld. Bonds	...	78 — 83
100	Do. 6% 50-yr. Mort. Bonds	— 3	78 — 82
...	Michigan United Railways 5% 1st Mort. Gld. Bonds	...	91½ — 93¼
100	Montreal Street Railway, Sterling 4½% Debs. (1922)	...	98 — 100
100	Do. 4½% Sterling Debs, (1922)	...	99 — 101
1	National Steam Car Co. Ltd.	— 3/16	11/16 — 13/16
10	Oldham—Ashton and Hyde Elec. Ord.	— 1/16	21/32 — 23/32
10	Do. do. 5% Cum. Pref.	...	5⅞ — 6⅛
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	5⅝ — 5⅞
5	Do. do. 6% Cum. Pref.	...	4⅜ — 4⅝
1	Perth (W.A.) Elec. Trams.. Ld., Ord.	...	4½ — 5
1	Potteries Electric Traction Co., Ltd., Ord.	...	—
1	Do. 5% Cum. Pref.	...	3/16 — 1/4
100	Do. 4½% Debenture Stock, Red.	...	21/32 — 23/32
1	Provincial Tramways, Lim., Ord.	...	84 — 87
10	Do. 5% 1st Deb. Stock	...	31/32 — 1 1/32
...	Puebla Tramway, Light & Power Co., Prior Lien 5%	...	95 — 98
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.	...	80 — 84
100	Do. do. 4½% 1st Mt. Db. Stk.	...	5 — 5½
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	95 — 97
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr, 5% Gd. Bds.	— ⅛	89 — 91
100	Do. do. 5% 50-yr. Mort. Gold Bonds	— 1½	100 — 102
100	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	...	92 — 94
$500	Do. 5% 1st Mort. Debs., Red., 1929	...	100 — 103
10	Shanghai Elec. Construction Co.	+ ⅛	99 — 102
100	Singapore Elec. Tramways Lim., 5% Debs. Red	+ 1	11¾ — 12¾
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref.	...	88 — 93
100	Do. do. 4% Deb. Stk.	...	5/8 — 3/4
..	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	66 — 70
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	97 — 99
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	+ ½	98 — 100
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	83 — 85
5	United Elec. Tramways of Monte Video, Ord.	...	93 — 95
5	Do. do. 6% Cum. Pref.	...	4⅝ — 5⅛
100	Do. do. 5% 1st Deb. Stk. Red.	...	4⅞ — 5¼
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	94 — 97
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	95 — 97
5	Do. do. 6% Cum. Pref.	+ ½	7/16 — 9/16
100	Do. do. 4½% 1st Deb. Stock. Red.	...	3⅞ — 4¾
			80 — 85

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

CITY AND COUNTY BOROUGH OF BELFAST.

The Tramways and Electricity Committee invite tenders for the Renewal and Reconstruction of Permanent Way for the twelve months ending March 31, 1915.

Forms of tender and other particulars can be obtained from the City Surveyor on payment of one guinea, which will be refunded on receipt of a *bona-fide* tender.

Tenders, endorsed "Tender for Tramway Renewals," to be lodged in my office before Monday, March 16, at 12 o'clock noon.

A tender, if sent by post, must be registered, and if delivered by hand an official receipt must be obtained for it, otherwise the undersigned will not be responsible.

The lowest or any tender will not necessarily be accepted

R. MEYER,
Town Clerk.

THE GREAT INDIAN PENINSULA RAILWAY COMPANY.

The Directors are prepared to receive tenders for the supply of the following Stores, namely:—

Tie Bars, Gibs, and Cotters.
Steel Rails and Fishplates.
Cast Iron Tank Plates, etc.
Water Cranes, etc.
Brake Rigging.

Specifications and forms of tender may be obtained at this office on payment of the fee for the specification, which payment will not be returned.

Tenders must be delivered in separate envelopes, sealed and addressed to the undersigned, marked "Tender for Tie Bars, Gibs, and Cotters," or as the case may be, not later than 11 o'clock a.m. on Thursday, March 12, 1914.

The Directors do not bind themselves to accept the lowest or any tender.

R. H. WALPOLE.
Secretary.

Company's Offices,
48, Copthall Avenue, London, E.C.,
March 5, 1914.

COUNTY BOROUGH OF NEWPORT.

ELECTRICITY AND TRAMWAYS DEPARTMENT.

The Corporation of Newport invite tenders for the supply of—

1. Wood-working Machinery.
2. Engineers' Machine Tools.

Specification, general conditions, and form of tender can be obtained upon application to Mr. A. Nichols Moore, Borough Electrical Engineer, Town Hall, Newport, Mon., on or after Tuesday next the 10th inst.

The Corporation do not bind themselves to accept the lowest or any tender.

Contractors will be required to pay the recognised Union rate of wages, and to observe the recognised hours and rules of labour in the district.

ALBERT A. NEWMAN,
Town Clerk.

Town Hall, Newport, Mon.,
March 5, 1914.

COUNTY BOROUGH OF NEWPORT.

ELECTRICITY AND TRAMWAYS DEPARTMENT.

The Corporation of Newport invite tenders for the supply of—

1. Rails, Tie-Bars, and Fish-Plates.
2. Special Trackwork, including Junctions, Cross-overs, and Portable Turn-outs.

Specification, general conditions, and form of tender can be obtained upon application to Mr. A. Nichols Moore, M.I.E.E., Borough Electrical Engineer, Town Hall, Newport, Mon., on or after Friday, March 6.

The Corporation do not bind themselves to accept the lowest or any tender.

Contractors will be required to pay the recognised Union rate of wages and to observe the recognised hours and rules of labour in the district.

ALBERT A. NEWMAN,
Town Clerk.

Town Hall, Newport, Mon.,
March 2, 1914.

COUNTY BOROUGH OF BURTON-UPON-TRENT.

TRAMWAYS DEPARTMENT.

UNIFORMS.

The Corporation of Burton-upon-Trent invite tenders for the supply of Tramway Uniforms.

Copies of the specification and conditions of tender may be obtained from the undersigned, to whom sealed tenders, endorsed on the outside "Uniforms," must be delivered by March 21, 1914.

No tender will be accepted from any party who pays his employees (whether artisans or labourers) less than the standard rate of wages paid in the Borough of Burton-on-Trent, or who does not conform to the hours and conditions of labour generally recognised in each branch of the industry affected, and clauses to ensure payment of the standard rate of wages, etc., for work done under the proposed contract will be inserted in the contract.

Only tenders which are made out on the forms to be obtained from the undersigned will be considered.

The Corporation do not bind themselves to accept the lowest or any tender, and parties tendering must do so at their own expense.

A. B. SLATER,
Tramways Manager.

Tramways Offices, Burton-on-Trent,
March 4, 1914.

COUNTY BOROUGH OF ROCHDALE.

TRAMWAYS DEPARTMENT.

CONTRACT FOR STORES.

The Tramways Committee of the Rochdale Corporation invite tenders for the following Stores for the year ending March 31, 1915:—

Gears and Pinions; Cast Iron and Malleable Iron Castings; Brass Castings; Iron and Steel; Springs; Ironmongery; Paints and Varnishes; Timber; Overhead Materials; Stationery and General Stores.

Further particulars, with forms of tender, may be had on application to the General Manager, Mr. George Webster, Tramway Offices, Mellor Street, Rochdale, on payment of the sum of 5s. for each form of tender, which amount will be refunded on receipt of a *bonâ-fide* tender.

Samples can be seen at the Tramway Offices. Tenders, addressed to the Chairman of the Tramways Committee, Tramway Offices, Mellor Street, Rochdale, must be delivered not later than 12 o'clock noon on Thursday, March 12, 1914.

The Corporation do not bind themselves to accept the lowest or any tender.

(Sd.) WM. HENRY HICKSON,
Town Clerk.

Town Hall, Rochdale,
February 26, 1914.

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CORPORATION OF RAWTENSTALL.

ELECTRICITY DEPARTMENT.

Contract No. 20.—Water Tube Boilers, Superheaters, Mechanical Stokers, and Steam Piping.

The Corporation invite tenders for the supply, delivery, and erection at the Electricity Works, Cloughfold, of Water Tube Boilers, Superheaters, Mechanical Stokers, and Steam Piping.

Copies of the general conditions, specifications, and forms of tender may be obtained on application to Mr. C. L. E. Stewart, A.M.I.E.E., Borough Electrical and Tramways Engineer, Electricity and Tramways Offices, Bacup Road, Rawtenstall, on payment, as a deposit, of the sum of £1 1s., which will be returned on receipt of a *bonâ-fide* tender, and on the return of all papers.

Additional copies of the specifications, etc., may be obtained on payment of half a guinea per copy, which will not be returned. Sealed tenders on the prescribed forms, endorsed "Contract No. 20, Water Tube Boilers," and accompanied by the general conditions and specification, etc., must be delivered to the undersigned, on or before 12 o'clock noon, Monday, March 23, 1914.

The Corporation does not bind itself to accept the lowest or any tender.

By order, James Whalley,
Town Clerk.

Town Hall, March 2, 1914.

COUNTY BOROUGH OF SOUTH SHIELDS.

CORPORATION ELECTRIC SUPPLY DEPARTMENT.

CONTRACT NO. 92.

The Corporation invite tenders for the supply, delivery, and erection of :—

Section No. 1.—Induced Draught Plant Motors and Control Gear as specified.

Section No. 2.—Self-supporting Steel Chimney as specified.

Single copies of specification, general conditions, form of tender, and form of contract can be obtained on and after Thursday, March 5, 1914, from Mr. Harry S. Ellis, Borough Electrical Engineer, South Shields, on payment of one guinea, which sum will be returned on receipt of a *bonâ-fide* tender. Further copies may be obtained at a charge of ten shillings per copy, which will not be refunded. Tenders on the form supplied, sealed and endorsed "Tenders for Contract No. 92," must be delivered to me at my office, Municipal Buildings, South Shields, on or before noon of March 13, 1914. The Corporation do not bind themselves to accept the lowest or any tender, and any acceptance will be subject to the sanction of the Local Government Board being obtained to the carrying out of the work.

J. Moore Hayton,
Town Clerk.

February 28, 1914.

(Continued on page 181.)

Whenever you are repainting your poles ask for samples of the Kearsley ready-mixed POLE PAINTS as supplied to important Companies at home and abroad. These Paints are durable, retain their colour during exposure, and prevent rust. Information free on request.

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SUPPLY
JARRAH
THE SANITARY WOOD PAVING
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Telegrams: "Jarrah, London." Telephone: 368, London Wall.

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THE "PEACOCK" BRAKE CO.,
27, CLEMENTS LANE, LONDON, E.C.
Telephone No.: 5935 CENTRAL.
Telegraphic Address: "INBRAKE," LONDON.

British, Foreign and Colonial Representatives:—

BRITISH ISLES. W. C. Knight, 75, Surrey Street, Sheffield. Wm. G. Yuille & Co., 60, Brown St., Anderston, Glasgow. Equipment & Supplies, Ltd., 7, Anglesea Street, Dublin.
FRANCE. Chas. d'Albert, 15, Avenue Larcher, Chatou (S & O).
GERMANY. Heinrich Vellguth, 1, Glockengies-serwall, Hamburg.
BELGIUM. l'Anglo-Belge Electrique, 72, Avenue de Tervueren, Brussels.
SWEDEN. E. & L. Davidson, Grefmagnigatan 15, Stockholm.
SWITZERLAND. G. Sigerist, 8, Mttl. Haldenstrasse, Winterthur.
ITALY. Chas. de Grave Sells, 5, Via Ponte Calvi, Genoa.
SPAIN. Peninsular Engineering Co., Puerta del Angel 10, Barcelona.
SOUTH AFRICA. F. Peaboly Rice, 2', Standard Bank Buildings, Johannesburg.
AUSTRALIA. H. A. E. Rothwell, Cromwell Buildings, Bourke Street, Melbourne, Victoria.
NEW ZEALAND. James Jackson, Box 731, G.P.O., Wellington.
JAPAN. W. M. Rooke & Co., 184, 5 Chome, Nakanoshima, Osaka.

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THE
Tramway and Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

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SATURDAY, MARCH 7, 1914.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

ACCIDENTS AND CAR DESIGNS.

In our issue of January 31 it was suggested that fresh consideration might usefully be given to the question of the best type of car for meeting average British conditions. The effect upon the wear of rails of increasing weights of cars and increasing speed is being severely felt on many lines, and there are not a few engineers and managers who are looking more favourably than hitherto upon the light single-deck car so popular on the Continent, which hauls one or more trailers when the traffic requires them. This arrangement is often advantageous alike as regards current consumption, repairs of cars, and maintenance of permanent way. From another point of view the question of the best type of car has been brought prominently forward during the past few weeks by several serious accidents in which cars have been overturned and a number of passengers have been injured. In some cases cars have run away downhill, and in others they have left the rails at curves on the level and have overturned. The former class of accident, in which cars run beyond control, has been more or less with us ever since electric traction was introduced. In spite of the very powerful brakes now employed, runaways still occasionally occur on steep gradients. The trouble may of course arise either from the fault of the human element, or from a defect developing in the brakes, with greasy rails as a contributory factor. Fresh attention, it may be expected, will be devoted to the effort for improving and simplifying brakes; but every tramway manager who has to deal with steep gradients will no doubt take steps to see that the training of drivers is made even more exhaustive than at present. From the point of view of the best type of car, it is tolerably obvious that the heavier the car is the more difficult it is to prevent it from running away downhill. Here, then, is another reason for managers and engineers considering afresh the light single-deck car. If two or three tons are taken off the weight of the car, and brakes of the same power are used, their stopping effect on the lighter vehicle must be much greater. If the light car hauls a single-deck trailer, the latter will be lighter still, and its brakes will be specially effective. Turning to the case of a car which, either from running away downhill, or from being driven too rapidly, capsizes at a curve, a similar conclusion may be reached. Capsizes are not confined to top cover cars, but there can be no doubt that the existence of a roof cover increases the liability to an overturn. When the scheme for a covered-in upper deck was first brought forward some years ago, the idea was that a light canopy should be used. For one reason or another—perhaps to save frequent repairs—the top cover has developed into what is practically a second car body perched on the top of the lower one. It is so heavy that the centre of gravity of the whole car is raised considerably, and the tendency to capsize is correspondingly increased. This tendency is further developed if a strong side wind is blowing, and it is, of course, aggravated, if the tramway, and consequently the car, are of narrow gauge. The latter feature is exemplified by the refusal of the Board of Trade to allow roof-covers on the cars of some narrow gauge tramways, particularly if they are on routes exposed to gales. It is possible in various ways to reduce the liability to capsize, but there can hardly be a doubt that a single-deck car, which has no canopy and no passengers aloft, gives much greater immunity than any other arrangement. The centre of gravity of a single-deck motor car, even when filled with passengers, should not be higher than about the floor level. Even the single-deck trailer, which has no weight of motors below the floor, can be made with a low centre of gravity. In regard accordingly to both classes of accidents which have been considered here, there is strong *prima facie* evidence in favour of the single-deck car. There are undoubtedly strong reasons why managers and engineers should go fully into the question, not merely from the point of view of reducing rail wear, but from that of lessening risk of accidents. With the fruits of Continental experience available, and with their own facilities for working out quantitatively and experimentally the exact results, there should be little difficulty in arriving at definite conclusions in the light of the local conditions of different towns.

THE TRAMCAR FOOT GONG.

The present arrangement, which may be said to be standard on all electric tramcars in this country, whereby a motorman gives warning of his approach by stamping violently with his heel on a pedal on the car platform, which in turn actuates a hammer on a steel gong bolted to the platform, is probably the crudest and most unsatisfactory appliance or method used in connection with modern tramcar practice. It appears to have been brought over to this country with the first electric car equipments which were imported from America, and to have been adopted and accepted, almost without question, for the sixteen years that have elapsed since that importation took place. The motorman is frequently stamping violently on the gong pedal when he should be steadily depressing his sand pedals, and in order to attempt to operate the two pedals simultaneously he has to "do a dance." This state of affairs is not conducive to that calm manipulation of the controller and the hand-operated brakes which is required in an emergency. Both hands are engaged, the

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left, perhaps, actuating the electric brake, and the right either the mechanical slipper brake or in holding on to the hand brake. Few practical tramway operators will contend for a moment that this position of things, viewed in the light of modern electric traction work, can be described as even approaching a satisfactory arrangement. Another unsatisfactory feature of the gong pedal is the fact that on the platform used by passengers it is apt to come up above the floor level, and that on some undertakings the conductors are not as careful as they should be in seeing that it is kept depressed. A few months ago a passenger made an unsuccessful endeavour to recover damages against the London County Council for injuries alleged to have been sustained by tripping on the pedal. Since then the conductors have shown vigilance in seeing that the pedal does not cause an obstruction. Considerable progress is being made in the brake question. The power brake which operates both slipper and wheel brakes is now in actual operation on scores of cars working under severe conditions. Tests have been made on numerous tramways with this type of brake, and there appears every likelihood of successful development and progress being made in this direction. Can the present crude foot gong be retained much longer without some effort being made to improve matters? What are the difficulties in the way of adapting an electrically operated gong, and leaving the old-time foot gong for use only in the event of failure of the electrically-operated gong? We feel sure it is only a case of attention requiring to be called to the matter, and for some of the practical assistants engaged in the operation of cars to set to work and bring to the notice of tramway undertakings an improved type of gong to be used for warning purposes. Perhaps the Municipal Tramways Association might consider it worth while to take up this matter and offer a small premium for suggestions in this direction.

DEARNE VALLEY TRAMWAYS SCHEME.

The Light Railway Commissioners on February 26 opened an inquiry at Barnsley into an application made by the Dearne Valley Light Railway Joint Board, comprising the Urban Councils of Wombwell, Wath, Bolton-on-Dearne, and Thurnscoe, for powers to construct a light railway to connect these towns with Barnsley, Mexborough, and Rotherham.

Mr. Ram, K.C., for the promoters, said that the total length of the proposed tramways would be about 18 miles, and the estimated cost of construction and equipment, inclusive of land and buildings, £90,000, an additional outlay raising the amount to £151,891. In this sum was included £21,650 for the erection of a generating station, but this expenditure would be obviated if a separate Provisional Order was granted to the Councils. The route would serve a much larger number of inhabitants in the near future owing to the extension of the South Yorkshire coalfield.

Mr. Stephen Sellon, the engineer for the promoters, dealt with the details of the plans. Barnsley, he intimated, had given their full support to the scheme, and Aidsley, while approving in principle, suggested road widenings. Local authorities had hesitated in carrying out necessary housing schemes because of the lack of locomotion. He estimated the car mileage per annum as 844,147, and the receipts per mile per annum at £1,954. The total profits, he considered, would be about £4,750. He had no doubt that the scheme would be successful. Mr. Sellon was cross-examined at great length by Mr. Clode, K.C. (for the Great Central Railway), to whom he admitted that a Barnsley tramway scheme had fallen through because somebody could not raise the capital required, Mr. Clode exclaiming: "But the ratepayers can." When it was put to Mr. Sellon that he had not been able to arrange for a junction with Mexborough he replied, "You must wait and see."

On February 27, Mr. Sellon, cross-examined by Mr. McGrath (West Riding County Council) and counsel representing Ardsley Council, said he had never seen any congestion of the roads, which were of medium width. Local witnesses were also called in support of the application, and their evidence was continued on February 28. They included Sir Charles Nicholson, M.P. for the Doncaster Division, who described the poor train service in the portion of the area included in his division. Questioned about the trackless trolley scheme between Mexborough and Manvers Main, Sir Charles said it was information to him that it would be completed before Christmas.

The inquiry was continued on March 2 at the offices of the Commissioners in London, when Mr. Sellon, the engineer, was cross-examined by Mr. Clode to show that the estimates of £151,000 for the railway and £56,000 for the electric lighting, were insufficient. Witness stated it was proposed to run a single-deck type of car. The line would not be going till 1916, and the population then, it was estimated, would amount to 66,200. The present population he estimated at 57,200.—How many times are you going to carry your population?—About eighty times.—That is 1,600,000 passengers to come from these various districts?—It shows a reasonable average figure. He estimated what the traffic would be. It worked out at 8s. 7d. per head of the population.—You estimated 844,000 car miles, and you look to make 10d. a mile?—Yes; that is about the average for England.—Mr. Clode: Barnsley traction system pays 3s. 2d., and Mexborough and Swinton 5s. 2d., compared with your 8s. 7d., that is only 29 times the population in Barnsley, and in Mexborough and Swinton 46 times the population. I would like to know how you arrived at the figures.—Cross-examined by Mr. Maccassie (for the Midland Railway), witness admitted that the scheme to a certain extent would be competitive with the Great Central Railway.—It is proposed to carry through the service into Rotherham and into Sheffield?—Our powers only go as far as the Market Place at Rotherham.—Do you know any other case where a light railway has been allowed for a distance such as this so closely parallel with a main line? I can show you two or three cases, notably the Potteries Light Railway. There it was considered by the railway that the light railway would act as a feeder. The Dearne Valley promoters proposed to use trail cars and to carry heavy goods traffic. He did not agree that certain bridges were unable to bear the weights proposed.

Mr. J. B. Hamilton, general manager of the Leeds Corporation tramways, supported the estimates of revenue and expenditure. He thought that 80 times the population to be carried was a very conservative estimate.—In answer to Mr. Phillips, witness stated that he abandoned the proposed generating station near the Wath Main Colliery.

On March 3 Mr. Sellon was cross-examined by Mr. Phillips, for Swinton and Mexborough Tramways Company, who said: Suppose you were to be allowed to come over our railless route what would be the effect on our scheme? I don't think you would be such donkeys as to try to run it. (Laughter.)—The Chairman (Hon. Gathorne Hardy): Assuming we are to sanction this line, a light railway, route No. 9 (the road from Mexborough to Manvers Main Colliery), I presume you would agree to pay the costs thrown away by the Mexborough and Swinton Company to obtain a Parliamentary concession for this route?—Witness: The point is this: the Mexborough and Swinton Tramway Company promoted a Bill providing for something much in excess of this particular portion.—The Chairman: I want to shorten the inquiry so far as I can, and it seems to me we are bound to impose such a condition.—Mr. Ram, K.C., for the promoters, stated that he would carefully consider the matter.—Witness, in reply to further questions, stated that the promoters had arranged running powers with Rotherham on the same basis as between Sheffield and Rotherham.—Mr. Phillips: Do you suggest the Commission should assist you to compel us to let you use our trolley wires on route No. 9?—If you were reasonable people you would consent to it.

Mr. J. B. Hamilton, re-called, was cross-examined as to road maintenance.

The Chairman said the view of the Committee in that matter was, generally speaking, unless there was some special reason, that there should be paving.

Mr. H. England, general manager, Yorkshire (West Riding) Tramways and Wakefield and District Light Railway, supported the estimates of the promoters, and said that if other tramways and light railways had been built on similar methods to those proposed in this case there would have been far more of them in the country to-day. The proposed construction on transverse sleepers, having regard to the possibility of colliery subsidence, would be very much more favourable than a concrete foundation. These light railways were required if the district was to be properly developed, for there was a large population living at a considerable distance from the railway stations. If the railway companies were reasonable, and made an arrangement for interchange and the issue of joint tickets, it would be very much better for the railways. And he thought the railways stood to gain, because they were not catering for the traffic. After giving the results of a traffic census, witness said that a tramcar was a safer vehicle in a narrow road. From the point of view of a regular schedule service, he should not entertain the omnibus. He did not think anyone had attempted to run a service such as was necessary in this district by any system of railless traction.

On March 4 Mr. England was cross-examined, when he stated that cars could be safely worked over the railway crossing at Wath. If setts were insisted on along the track the Order would have to be abandoned.—An objection raised by the Yorkshire Power Company was ventilated, and Mr. Ram, K.C., said he was prepared to negotiate for current if the company would abandon their right to charge the maximum.—Mr. J. Ledger, clerk to the Dearne Valley Light Railway Board, was also examined.

The case for the opposition was then entered upon, the objectors including Earl Fitzwilliam, a frontager, and the railway managers. Mr. Mitchell, managing director of a colliery, said the light railway would not serve the men of his colliery. They preferred chars-a-bancs to motor omnibuses, and he thought they would prefer them to a light railway, which he feared would involve a rate in aid.

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Further local evidence was heard on March 5, and yesterday, when expert witnesses were also called by the opposition. Mr. Robert Hammond, consulting engineer, said it was a most serious thing to spend £150,000 on tramways in the face of omnibus competition and the possibility of the Great Central Railway electrifying their local service.

L.C.C. TRAMWAY MATTERS.

NEW CROSS-OVERS NEEDED.

At last Tuesday's meeting of the London County Council the Highways Committee reported that in order to cope with the number of passengers who congregated at the Elephant and Castle it was frequently found desirable to turn cars in Newington Causeway. To facilitate this operation it was necessary to instal a cross-over. In order to deal more expeditiously with the obstruction and congestion of the tramway traffic which were continually arising in this district, an additional cross-over in Borough Road would considerably assist the diversion of cars, and enable the services to be more effectively maintained. The installation of the cross-overs was estimated to cost £2,000, which included £1,100 for special work, £120 for rails and fastenings, and a sum for pipe alterations. It was proposed that the work should be carried out by the staff of the tramway department, and that the special track-work required should be obtained from Hadfield's Steel Foundry Company at a cost not exceeding £1,100.

ARCHWAY ROAD AND THROUGH RUNNING.

The Committee had again under consideration the question of the arrangements to be made for the working of the Council's tramways in Archway Road. In December last the Council had decided that the then existing arrangements with the Metropolitan Electric Tramways, Limited, for the working of the line should be continued up to March 31, subject to the payment by the company to the Council of a rent of £2,500 a year. The company had now suggested that in view of the negotiations at present taking place for through running along this line the existing agreement should be extended at the present rent for a further six months, or until such earlier date as it might be possible to institute through running. The Committee recommended that this proposal should be accepted.

PROSPECTIVE WORK.

Two 50 kw. motor generators had recently been discarded from sub-stations and larger plant had been substituted. The Committee were advised that these two machines if reconstructed and rewound could advantageously be used at Greenwich power station. They proposed that tenders for the work should be invited from selected firms.

Since the pump used for draining water out of tramway cable manholes was purchased, two deep manholes had been constructed at Vauxhall Cross, and the existing pump was inadequate to cope with the water in wet weather. The Committee accordingly proposed that tenders should be invited from selected firms for the supply of a larger pump, which would be electrically driven.

The various recommendations were adopted.

MISCELLANEOUS NEWS AND NOTES.

The First-Class Cars at Birmingham.—While the cost of running the first-class cars on the Hagley Road route is stated to be 9d. a mile, the receipts so far have averaged only 6d. a mile. A 20-minutes' service has been run. Six vehicles have been fitted up for use as first-class cars.

Top Covers and Inter-Running at Bexley.—Consideration of the question of providing top covers to the cars of Bexley Council has been deferred pending a decision with regard to inter-running with the London County Council. The estimates for the year ending March 31, 1915, provide for a contribution of £650 in aid of the tramways undertaking.

Car and Omnibus Return Tickets.—The London General Omnibus Co. are gradually extending to all their routes the system of return tickets at reduced fares, which was instituted by the tramways early in 1913 in order to meet the competition. After a trial of return tickets on two routes, East Ham Tramways Committee have extended the system to other districts.

Manchester All-Night Cars.—A committee of the Manchester and Salford Labour Council has been appointed to promote the running of all-night cars in Salford. A suggestion that the Manchester tramwaymen had been under some disadvantage owing to the all-night service in the city was repudiated by a delegate of the men, who stated that they were tumbling over each other in their eagerness to be put on night duty.

Metropolitan Association of Electric Tramways Managers.—A meeting of the members of this Association was held on February 27, at the Municipal and County Club, Whitehall, S.W., when Mr. Ullmann (East Ham) presided, and the members present were Messrs. Coveney (Erith), Schofield (Leyton), Harvey (Ilford), Moffet (West Ham), Hammond (Metropolitan Electric), Mason (South Metropolitan), and Goodyer (Croydon), hon. secretary.

Encouragement of Private Enterprise.—At a St. David's Day dinner at Colwyn Bay, Mr. W. Horton, the vice-chairman of the local authority, alluded to the success of the Llandudno and Colwyn Bay Electric Railway, and said that when tramways were offered to Rhyl the Council there would not hear of them, but now they would offer £10,000 towards a scheme. The local authorities in North Wales did not seem to realise the value of private enterprise, and would not see that it was to their interest to put private enterprise on velvet and encourage it.

Liverpool Trying Three Types of Omnibuses.—It is stated in the report for 1913 of Mr. C. W. Mallins, general manager, Liverpool Corporation Tramways, that motor omnibuses were placed in service on the Calderstones Park and Woolton route in November, 1912. The number of passengers carried last year was 295,023, and the receipts were £2,228. The committee were trying three different types of omnibuses for the purpose of ascertaining which was the most suitable for operation in Liverpool.

Obstacles to London Extensions.—In refusing to consent to the proposed extension of the tramways to Aldgate the City Corporation have acted on the advice of the police, who state that the congestion at that spot would be made dangerous. The Corporation are willing to assent to an extension to Charles Street, near Ludgate Circus if the County Council will undertake not to apply for powers to cross the Circus, and will widen Farringdon Road between Charterhouse Street and Charles Street. The road is already one of the widest in London, and the proviso renders the tramway impossible from a financial standpoint.

Sheffield's Application for Motor Omnibus Powers.—The Sheffield Corporation Bill on March 3 was before the Court of Referees of the House of Commons, on the petition of the Rotherham Corporation, who sought to be heard against it when before the Select Committee. Mr. Ram, K.C., claimed a *locus standi* on the ground that their omnibus and other services would be adversely interfered with. Sheffield Corporation were already empowered to run omnibuses within the city, and along specified routes outside the city, but this Bill proposed to enlarge the outside area, and to run along routes not specified. This would enable them to tap traffic which now went through Rotherham. The Court refused the *locus standi*.

Eight Miles of Subways Proposed for Montreal.—Mr. G. Janin, Chief Engineer of Public Works, Montreal, has presented to the Board of Control a report upon the proposals for improving traffic facilities submitted by the Tramways Company and the Canadian Autobus Company. He states that it would be better to outline a general plan for improving the transportation facilities, and he submits a scheme for the construction of three subways with a total length of 8.21 miles, estimated to cost $20,600,000. Extensions of surface lines are also proposed. In Sherbrooke Street and other boulevards it is suggested that the Tramways Company should operate a service at a five-cent fare. The same amount of fare would be charged on the subways. The company would be called upon to pay half of the interest and sinking fund on the city's part of the cost of the subways and tunnels.

Dividing a Deficit Between the Ratepayers and Passengers.—Unanimous assent has been given by the Stalybridge and District Joint Tramways Board to an increase in the minimum fare from a halfpenny to a penny, except for children. The latter are to be allowed to travel at half-fare between the ages of 3 and 14, instead of between 3 and 12. Alderman R. Wood, the chairman, in introducing the alterations, stated that up to the present time the lowest precept the ratepayers had had to find was £5,938, and it was felt that any other charge required should as far as possible be met by the users of the cars. They were practically carrying all the travelling public they could possibly carry. Among other things which rendered this change necessary was the increase in wages to the amount of £1,200 per annum. Repairs to rolling-stock would require an extra £500 a year for some years to come, and repairs and reconstruction of track would cost not less than £3,000 a year. Thus the next precept would probably be about £10,000.

Decrease in Corrugations Follows Joint-Welding.—In the borough engineer's (Mr. E. G. Mawbey) portion of the Leicester Corporation Tramways report for 1913, he states that the track has been improved by the insertion of a number of anchors, both joint and intermediate, rendering practically the whole of it free from any looseness or apparent vibration, and all the routes are now in very good order. The oxy-acetylene welding plant has still further proved its value, especially in connection with the renewals, rail-grinding to remove corrugations having this year only been necessary to less than half the extent done during the preceding twelve months. The amount expended on the permanent way was £6,056, of which £4,443 was paid in wages and £2,513 in material. In the near future more or less extensive renewals and higher maintenance costs must be looked for. The report of Mr. T. R. Smith, the electrical engineer, records very heavy repairs to the roof structures of many of the cars, and every care has been given to the electrical equipment of the cars.

Automobile Engineers Visit the Works of W. A. Stevens, Limited.—The London graduates of the Institution of Automobile Engineers paid one of the most interesting visits in the history of the section on February 21 to the works of Messrs. W. A. Stevens, Limited, Maidstone. The party were received by Mr. Stevens and by Mr. Barnwell, the assistant engineer. The works, which are quite new and are not even yet in full working order, show that plenty of room has been allowed for expansion, although even now a very fine equipment of machine tools is installed. The well-known Stevens-Tilling petrol-electric omnibus was seen in various stages of construction, while an interesting feature was the presence of a number of Hastings surface contact electric tramcars which were being converted to the petrol-electric system. The engine testing department provided many matters of interest. The engines are run on town gas and drive dynamos by which the output can be measured, and this output is used to drive the works plant. In addition to this, current is supplied to assist the local Corporation supply to such an extent that even the peak load can be carried without putting in additional generators. The graduates are promised another visit to these works in a year's time, when it is hoped that they will be in full operation.

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PERSONAL.

Mr. J. F. C. Snell is preparing a report on the position of the Ayr electricity supply undertaking for the Ayr Council.

Mr. Barnes Kay, tramways manager and electrical engineer to Haslingden Council, has been voted an increase of salary.

Mr. Frank Ayton, tramways manager and electrical engineer to Ipswich Council, and hon. secretary of the Electric Vehicle Committee, has been co-opted as a member of one of the panels of the British Engineering Standards Sub-committee on Electrical Plant.

Mr. J. W. Dugdale, general manager of Oldham Corporation tramways, was reported by the Chairman of the Tramways Committee to be confined to bed on February 26. His medical adviser had forbidden him to attend that meeting, and stated that it would be some time before he could resume his duties. The committee decided to forward to Mr. Dugdale an expression of their sympathy with him in his indisposition.

Promotion and Increased Salaries at Manchester.—The following recommendations have been made concerning the tramways staff:—Mr. J. Wood, financial superintendent, to be assistant manager, with an increase of his salary from £500 to £600 by four annual instalments; Mr. D. G. Mallalieu, permanent way superintendent, to receive two annual increments of £25 to his salary of £300; Mr. J. T. Oakes, traffic superintendent, to receive an increase of £25 on his salary of £475.

CONTRACTS AND ORDERS.

H. Lotery and Company, of London, have been awarded a contract for tramwaymen's uniforms by Bury Council.

C. A. Parsons and Company, Limited, have secured a contract for supplying a turbine to Derby Corporation electricity works, at £7,017.

Prahran and Malvern Tramways Trust have accepted the tender of Stewarts and Lloyds (Australia), Limited, for 1,280 steel poles, £6,680.

Messrs. Johnson and Phillips were the successful tenderers for supplying an eight-panel high tension steel cubicle type switchboard to Plymouth Council.

The Magneta Time Company have received a contract for the installation of a municipal time service at Blackpool and automatic clocks on the tramway routes.

London County Council have agreed to order from Hadfield's Steel Foundry Company the special trackwork required for two new cross-overs in Southwark at a cost of £1,100.

West Hartlepool Council have bestowed contracts as appended:—Tramwaymen's tunics and trousers, Pearson, Huggins and Co., London; oilskins, Dowson and Sons, Great Yarmouth.

Hadfield's Steel Foundry, Limited, have been awarded the following contracts:—Tramway points and crossings, Bolton Corporation; tramway junction, at £1,355, and a cross-over, at £342, Newcastle-on-Tyne Corporation.

Southampton Council have awarded the following contracts:—Alternating-current meters, British Thomson-Houston Company, Limited; pipes, troughs, and covers, Doulton and Co., Limited; conduits, Oates and Green, Limited.

Sunderland Council have awarded contracts as follow:—Cable, British Insulated and Helsby Cables; two switch cabinets, Ferranti, Limited; switch cabinet, A. Reyrolle Company; rewinding two 750 kw. alternators, Phœnix Dynamo Company; links for boiler grates, Babcock and Wilcox, Limited.

The Albion Motor Car Company, Limited, have received an order for eight vehicles from the British Petroleum Company, Limited, London, distributors of "Shell" motor spirit. The order is for two 32 horse-power Albion three-ton vehicles and six 25 horse-power two-ton vehicles. It may be added that the British Petroleum Company purchased their first three-ton Albion in August, 1913.

Glasgow Tramways Committee have allotted the following contracts:—Armature coils, Manchester Armature Repair Company; special trackwork, Hadfield's Steel Foundry, Limited; E.H.T. rubber cable, British Insulated and Helsby Cables, Limited; tinned iron and zinc sheets, P. and W. M'Lellan, Limited; wood surface planing machine, John M'Dowall and Sons; metal filament lamps, W. C. Yuille and Co., Limited.

Accrington Council have accepted the following tenders on the recommendation of the Tramways Committee:—Five double electrical equipments, Dick, Kerr and Company; two double-deck top-covered bogie car bodies, with vestibules top and bottom, three single-deck bogie car bodies with vestibules, and ten Brush maximum traction trucks, M.E.T. type, the Brush Electrical Engineering Company; five double equipments of magnetic track brakes, the British Westinghouse Company.

Salford Council have given contracts as appended:—Induced-draught plant for heating car shed at central car depôt, Pendleton, £71 18s. 6d., Musgrave and Co., Limited; switchgear, for Ordsall transformer sub-station, £603, Ferguson, Pallin and Co.; two three-phase oil-insulated self-cooled power transformers, £366, Ferranti, Limited; 40 h.p. slow-speed motor, to drive air compressor, £131 10s., Lancashire Dynamo and Motor Company, Limited; 1,500 yards of three-way stoneware conduits, 1s. 11¾d. per piece 2ft. 6in. in length, T. Wragge and Sons, Limited.

Liverpool Tramways Company have placed contracts as follow:—Rubber goods, etc., L. Andrew and Co., Avon India-Rubber Company, Limited, Geo. MacLellan and Co., North British Rubber Company, Limited; lubricating oils and greases, Dee Oil Company, Limited, Joshua Rea and Sons, Limited, Vacuum Oil Company, Limited; steel gears and pinions, R. W. Blackwell and Co., Limited F. W. Rowlands and Co.; wrought-iron lamp standards, brackets, etc., A. B. Dalzell and Co., Ashmore and Co., Messrs. Killick and Cochran; cast-iron lamp columns and plugs, Newton Chambers and Co., Limited, Messrs. Killick and Cochran.

FINANCIAL REPORTS AND MEETINGS.

Manila Electric Railroad and Lighting.—A dividend has been declared at the rate of 1¾ per cent. ($1.75 per share) for the quarter ending March 31.

South Staffordshire Tramways Company.—For 1913 the directors recommend a dividend of 3½ per cent. on the preference shares, carrying £603 forward.

Brazilian Traction and Light Company.—A dividend of 1½ per cent. for three months to March 31 on 6 per cent. cumulative preference shares has been declared.

British Insulated and Helsby Cables.—A dividend of 9s. per share has been declared, £90,500 being placed to reserve, and £98,000 carried forward. The dividend a year ago was 6s. per share.

Hadfield's Steel Foundry Company.—The directors recommend a final dividend of 2s. and a bonus of 1s. per share on the ordinary shares, making 4s. (20 per cent.), free of income-tax, for the past year.

W. T. Henley's Telegraph Works.—The profits for 1913 were £112,509. It is proposed to add to the reserve for depreciation of securities £5,284, and to general reserve £15,000. A final dividend on the ordinary shares of 10 per cent., free of tax, is proposed, making 15 per cent. for the year. A bonus of 5s. per share, free of income-tax, is also recommended, leaving to be carried forward £50,065.

Stewarts and Lloyds.—The directors, after establishing a fund of £2,000 for the benefit of the employees and setting aside £100,000 for depreciation and £50,000 to reserve, recommend a dividend of 2s. per share on the deferred shares, with a bonus of 6d. per share, leaving £95,000 to be carried forward. A year ago the dividend was 1s. 6d. per share on the deferred shares, £100,000 was set aside for depreciation, £50,000 was placed to reserve, and £50,000 carried forward.

The British Electrical Federation.—The traffic statement for the week ended February 27, 1914, shows that the receipts from tramways and railways amounted to £38,324, as compared with £35,727 in the corresponding week last year, and from omnibuses £12,918, as compared with £2,581, making a total of £51,242, as compared with £38,308. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year the receipts show an increase of £2,377 upon the week.

Jarrow and District Electric Traction Company.—For 1913 the total revenue was £7,733, an increase of £500. The sum of £800 is placed to renewals, and there remains a surplus of £2,458 and £843 was brought forward. The directors propose to place to reserve £1,025; pay a dividend on ordinary shares at rate of 2½ per cent. for the year, £1,248; and carry forward, £1,028. The Northern General Transport Company, Limited, which was formed to carry on and develop transport business in all its branches, made an offer to the shareholders to exchange their holdings for fully-paid holdings in the Transport Company, and holders of 99 per cent. of the capital had accepted.

Bath Electric Tramways Company.—The receipts for 1913 were £50,805, and the profits were £17,003, while £1,430 was brought forward. After providing for debenture interest, dividends on preference shares, and the addition of £4,000 to the renewals fund, £2,624 remains, which it is proposed to carry forward. In order to provide for the repayment of the bank loan and the provision of further capital the directors recommend that the dividends on the preference shares be suspended for five years, but that the arrears be paid by instalments from the seventh year onwards. Further road motor vehicles are to be obtained to meet the necessities of the growing traffic. Sir James Sivewright, presiding at the annual meeting on March 4, said that the year had been the best they had had in regard to mileage, traffic receipts, and net earnings. The chars-a-banc and omnibuses had had an excellent season. Some discussion took place on the financial scheme, several speakers opposing it. A resolution was carried adjourning the meeting to June 4 next, and appointing a committee, consisting of Messrs. Rowe and Hamilton and Dr. Moody, to confer with the board regarding the rearrangement of the finances.

Tramways, Light and Power Company.—Viscount Chilston presided at the first ordinary meeting on February 27. In moving the adoption of the report he stated that the company was formed in December, 1912, when 300,000 six per cent. cumulative preference shares of £1 each were offered to the public. An issue was made of £200,000 five per cent. debenture stock in December last, and the proceeds of this issue were sufficient to meet the capital obligations undertaken when the company was formed and to satisfy the purchase price of the Midland Electric Light and Power Company. That company owned the whole of the issued share capital and debentures of the other companies which they had acquired, viz., the Derbyshire and Nottinghamshire Electric Power Company, Nottinghamshire and Derbyshire Tramways Company, the Leicestershire and Warwickshire Electric Power Company, the Leamington and Warwick Electrical Company. The directors had under consideration the acquisition of other properties, provided the cash yield on the purchase price was attractive. After paying this company the interest and dividends shown in the profit and loss account, the various subsidiary companies had balances carried forward to this year's account amounting to nearly £4,000. The directors had every reason to be satisfied with the earnings of the current year.

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Lancashire United Tramways and Goods Carriage.—The Hon. Arthur Stanley, M.P., presiding at a meeting in London of the Lancashire United Tramways, on February 27, said that the working of the combined undertaking had produced a profit of £27,053, which was an increase of £8,187 over 1912. The traffic earnings per mile showed a satisfactory increase from 8.21d. to 9.04d. Although they had earned £27,653 they did not think it would be advisable to make any payment of interest on the second mortgage debenture stock, and therefore they had only transferred from the operating companies sufficient revenue to enable them to meet the interest on the prior lien debenture stock and working expenses. The balance, £14,994, had been retained in the operating companies, the bulk of it being placed to renewals account and the remainder carried forward. The Liverpool Corporation were considering a report by their general manager on the carriage of goods by tramways. This company were willing to co-operate in every possible way, and he hoped that the Mersey Dock and Harbour Board would shortly be approached to see whether they would co-operate.

Liverpool Tramways in 1913.—The report of Mr. C. W. Mallins, the general manager, gives the total revenue for the year 1913 as £715,120, and operating costs (including rental of leased lines) £451,657, leaving a gross profit of £263,453. The latter amount had been apportioned :—To interest, £48,971; sinking fund and repayment of loans, £60,319; reserve, renewal, and depreciation account, £54,163; and contribution in aid of the general rate, £100,000. The net profit amounted to £154,162, an increase of £20,305. The sum set apart for sinking fund and redemption of debt since the tramways were taken over by the Corporation in 1897 has amounted to £1,091,771, and to reserve, renewal and depreciation, £765,803. The amount contributed in relief of the rates was £472,899. The sum paid in rates and taxes amounted to £356,983. Passengers carried during the year numbered 144,085,927, as against 134,449,067, an increase of 7.3 per cent. The receipts were £677,881, as compared with £631,071, an increase of 7.4 per cent.; and the miles run were 13,442,605, against 12,590,408, an increase of 6.8 per cent. The average earnings per car mile for 1913 amounted to 12.10d., as against 12.03d. The traffic receipts and car mile earnings, together with the passengers carried, were the highest recorded in connection with the Liverpool tramways. In July the King and Queen's visit to the city greatly increased the takings.

WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended February 28 amounted to £221,842, or £14,220 more than in the corresponding week last year, while the track mileage was 2,863, or 24 more than for the corresponding week. The receipts were at the rate of £77 9s. 8d. per track mile, an increase of £4 7s. 1d. per mile as compared with last year.

(Continued from page 176.)

LANCASTER CORPORATION.

TRAMWAYS COMMITTEE.

The Tramways Committee of the Lancaster Corporation invite tenders for the supply of Uniforms, etc., in accordance with the samples and detailed list deposited at the Tramway Traffic Manager's Office, Town Hall, Lancaster, from whom further particulars may be obtained.

Tenders, with samples of materials, marked "Tramway Uniforms," to be delivered to the undersigned on or before Friday, March 13, 1914.

T. CANN HUGHES,
Town Clerk.

Town Hall, Lancaster,
February 25, 1914.

COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

The Electricity and Tramways Committee of the County Borough of Warrington are prepared to receive tenders for :—

1.—750 kw. Rotary Converter.

2.—E.H.T. Switchboard Panel.

Specifications and forms of tender can be obtained from the undersigned on payment of one guinea for each specification, which will be returned on receipt of a *bona-fide* tender. Five shillings will be charged for extra copies of either specification.

Tenders, addressed to the Chairman of the Electricity and Tramways Committee, Town Hall, Warrington, must be sealed with wax, and endorsed "Tender for 750 kw. Rotary Converter" or "E.H.T. Switchboard Panel," as the case may be, and delivered not later than 12 o'clock noon on Tuesday, March 31, 1914.

The lowest or any tender will not necessarily be accepted.

F. V. L. MATHIAS, M.I.E.E.,
Borough Electrical and Tramways Engineer.

Howley, Warrington.

CORPORATION OF WALLASEY.

TRAMWAYS.

TENDERS FOR UNIFORM CLOTHING.

The Corporation are prepared to receive tenders for the supply of Uniform Clothing for the Tramway Inspectors, Drivers, and Conductors, for one, two, or three years, at the option of the Corporation.

Particulars and forms of tender may be obtained on application to the Tramways General Manager, at his office, Seaview Road, Wallasey, where also sample garments may be inspected.

Tenders, to be endorsed "Tender for Uniform Clothing," and addressed to and reach the undersigned by post not later than 10 a.m. on Wednesday, March 18, 1914.

The Corporation do not bind themselves to accept the lowest or any tender.

By order, H. W. COOK,
Town Clerk.

Town Hall, Wallasey,
March, 1914.

COPPER AND ALUMINIUM MARKET.

March 6, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

	Friday, March 6.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	64 2 6 ..	64 5 0 ..	65 15 0
,, (three months)	64 12 6 ..	64 15 0 ..	66 0 0
Electrolytic Copper—bars or ingots ..	66 10 0 ..	67 5 0 ..	69 10 0
Aluminium—bars or ingots	83 0 0 ..	83 0 0 ..	89 0 0

COAL MARKET.

March 6, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

	Friday, March 6.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	
Best Admiralty Welsh (large)	23 6 ..	23 6 ..	24 9 ..	Owing to the miners' strike there were no quotations.
Best Seconds	23 0 ..	23 0 ..	24 3 ..	
Ordinary Drys	21 0 ..	21 6 ..	23 0 ..	
Best Washed Nuts	21 0 ..	21 0 ..	22 0 ..	
Best Washed Peas	19 6 ..	19 6 ..	20 6 ..	
Cardiff, f.o.b.—				
Best Admiralty (large) ..	19 0 ..	19 0 ..	19 9 ..	
Best Seconds	18 6 ..	18 6 ..	19 3 ..	
Ordinary Drys	16 6 ..	17 0 ..	18 0 ..	
Best Washed Nuts	16 6 ..	16 6 ..	17 0 ..	
Best Washed Peas	15 0 ..	15 0 ..	15 6 ..	
Newcastle, f.o.b.—				
Best Steams	14 0 ..	13 9 ..	15 0 ..	
Best Seconds	12 0 ..	11 9 ..	14 0 ..	
Smalls	6 9 ..	6 9 ..	10 6 ..	

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregate. Wks.	Aggregate. 1913-4.	Increase or Dec.
Anglo-Argentine	Feb. 25	£55,202	£56,516	8	£455,119	+ £17,384
Auckland..... (28 days)	Feb. 13	20,117	23,552	33	159,090	— 439
Ballarat and Bendigo	Jan.	5,169	5,075	42	39,650	— 818
Brazilian St. Rly. Mlrs.	Jan.	46,268	54,689	26	319,153	+ 54,032
Brazilian Traction.....	Feb. 28	93,150	97,108	9	854,428	+ 63,054
Brisbane.....	Jan.	24,810	28,330	4	28,330	+ 3,520
British Columbia .....$	Jan.	743,271	777,102	31	5,330,828	+ 336 733
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacroze..	Feb.	40,624	40.377	34	356,928	+ 8,140
Calcutta.....Rs.	Feb. 28	65 510	69,418	8	6,16,662	+ 29,368
Cape Town	Jan.	...	14,646	...	...	...
Carthagena & Herrerias	Feb.	8.053	2,919	8	5,695	— 682
Cordoba	Jan.	11,859	12,735	43	133,055	+ 11,904
East India	Feb.	1,622	1,701	30	13,518	+ 516
Kalgoorlie.....	Dec.	3,206	2,907	52	34,510	— 8,300
La Plata.....	Feb.	4,942	4,766	8	10,062	— 455
Lima.....	Sept.	22,660	34,110	39	300,647	+ 23,783
Lisbon ..... Mlrs.	Sept.	...	144,538	...	...	...
Madras (14 days) Rs.	Feb. 28	22,078	23,055	8	109,932	+ 9,346
Melbourne	Dec.	...	69,000	...	...	...
Mexico .....$	Jan.	561,635	579,361	4	285,348	— 6,028
Montevideo.....	Feb.	34,368	35,805	17	137,901	+ 1,366
Para	Mar. 1	4,087	3,468	13	44,395	— 8,885
Port Elizabeth.....	Jan.	...	19,476	...	...	...
Shanghai .....$	Feb. 25	19,421	21,000	7	189,800	+ 32,137
Singapore .....$	Feb. 28	11,088	12,072	8	108,573	+ 6,455
Toronto .....$	Jan.	776,928	847,945	4	847,945	+ 71,017
Winnipeg..... .....$	Jan.	351,497	382,670	4	382,670	+ 31,173

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Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks	1913-4.	Increase or Dec.
Aberdeen Corporation..	Feb. 25	£1,376	£1,471	+ £99	39	£62,584	+ £3,499
Accrington Corp.....	,, 21	495	546	+ 51	47	27,077	+ 2,332
Ayr Corporation	,, 28	186	230	+ 44	41	15,312	+ 2,215
Bath Electric	,, 25	640	734	+ 94	8	5,594	— 11
Birkenhead Corp.	Mar. 1	1,293	1,413	+ 120	48	61,922	+ 5,648
Birmingham Corp.	Feb. 28	11,184	12,409	+ 1,225	48	572,221	+ 48,241
Blackburn Corporation	,, 25	1,048	1,203	+ 155	48	62,110	+ 5,162
Blackpool Corporation	,, 26	473	535	+ 62	47	81,270	+ 12,590
Bolton Corporation	Mar. 1	2,535	2,606	+ 71	48	131,048	+ 7,217
Bournemouth Corp.....	,, 4	1,643	1,632	— 11	48	97,986	+ 9,684
Bradford Corporation...	Feb. 28	5,224	5,818	+ 594	47	282,954	+ 17,675
Brighton Corporation...	Mar. 2	749	870	+ 121	48	51,126	+ 3,113
Bristol	Feb. 27	6,562	7,206	+ 644	8½	60,696	+ 4,044
British Elec. Federatn.	,, 27	38,308	51,242	*	...	...	...
Burnley Corporation ..	,, 28	1,582	1,596	+ 34	48	81,299	+ 8,196
Burton-on-Trent Corp.	Mar. 1	249	281	+ 32	48	14,128	+ 748
Bury Corporation.....	,, 1	1,247	1,289	+ 42	48	64,393	+ 2,436
Cardiff Corporation.....	Feb. 21	2,250	2,579	+ 329	47	127,457	+ 11,879
Chatham & District..	,, 28	784	798	+ 14	8	6,474	— 294
Chesterfield Corp.	,, 26	235	254	+ 19	47	12,334	+ 1,332
Colne & Trawden.....	,, 28	231	240	+ 9	9	2,125	+ 102
Cork Electric.....	,, 26	410	442	+ 32	8	3 576	+ 20
Croydon Corporation ...	,, 20	1,349	1,537	+ 188	46	76,267	— 6,104
Darlington Corporation	,, 28	215	241	+ 26	48	11 952	+ 1 100
Derby Corporation	,, 28	863	929	+ 66	48	46,918	+ 4,211
Dover Corporation	,, 21	177	192	+ 15	47	11,342	+ 88
Dublin & Lucan	,, 27	118	116	+ 3	8	925	— 16
Dublin United	,, 27	5,145	5,213	+ 68	9	42,709	— 2 293
Dundee City	Mar. 4	1,196	1,264	+ 68	43	54,817	+ 3,723
East Ham Corporation	Feb. 28	1,056	1,003	— 53	43	43,542	— 2,328
Exeter Corporation	,, 27	259	289	+ 30	48	16,150	+ 734
Gearless Motor 'Buses.	,, 28	...	478	...	9	3.811	...
Glasgow Corporation ...	,, 28	19.411	20,595	+ 1,184	39	795,268	+ 56,755
Glossop(U.Elec.Supply)	,, 28	117	118	+ 1	9	1,074	— 6
Halifax Corporation ...	,, 24	1,815	1,986	+ 171	47	99,015	+ 3,780
Hastings & District.....	,, 25	674	744	+ 70	8	5,463	— 136
Huddersfield Corp.	,, 28	2,000	2,170	+ 170	48	102,179	+ 5,316
Hull Corporation	,, 28	2,971	3,121	+ 150	48	151,935	+ 7,804
Ilford U.D.C.	,, 28	497	435	+ 28	47	21,490	— 877
Ilkeston Corporation ...	Mar. 4	113	126	+ 13	49	6,430	+ 893
Ipswich Corporation ...	Feb. 28	345	366	+ 21	48	21,514	+ 733
Isle of Thanet	,, 21	285	337	+ 52	22	7,333	+ 581
Kilmarnock Corp.	,, 28	147	161	+ 14	41	7.233	+ 471
Lanarkshire	,, 26	1 511	1,816	+ 305	8	14,826	+ 1,800
Lancashire United	,, 25	1,302	1,521	+ 219	8	12.272	+ 1,674
Leeds City	,, 28	7,545	8,181	+ 636	48	388,158	+ 16,330
Leicester Corporation...	,, 28	2,574	2,785	+ 211	9	23,324	+ 1,338
Leith Corporation	,, 28	615	685	+ 70	41	29,180	+ 1,402
Leyton U.D.C.	Jan. 29	1,145	1,170	+ 25	43½	58,277	— 165
Liverpool Corporation..	Feb. 28	11,792	12,716	+ 924	8	106,904	+ 5,632
Llandudno & Colwyn B.	,, 27	164	162	— 2	13	1,938	+ 4
London County Council	,, 25	39,340	41 944	+ 2,604	46	1,995,705	+ 13,058
London Gnl. Omnibus..	,, 28	54,752	58,520	+ 3,768	9	497,644	+ 4,201
London United	,, 27	5.245	5,465	+ 220	9	44,232	+ 678
Lowestoft Corporation	,, 28	125	154	+ 29	21	3,902	+ 351
Maidstone Corporation	,, 26	153	162	+ 9	48	9,599	+ 638
Manchester Corp.....	,, 28	16.848	17,262	+ 414	48	839,681	+ 36,301
Met. Elec. Trys.	,, 27	8.294	8,497	+ 193	9	68,901	— 188
Nelson Corporation.....	,, 28	176	211	+ 35	48	9,970	+ 554
N'castle-on-Tyne Corp.	,, 23	4,542	4,940	+ 398	48	236,246	+ 21,392
Newport (Mon.) Corp....	,, 28	712	736	+ 24	48	36,798	+ 2,540
New St. Helens & Dist...	,, 25	648	736	+ 88	35	28,281	+ 2,603
Northampton Corp	,, 27	487	520	+ 33	48	27,376	+ 1,616
Nottingham Corp.	,, 26	3,063	3,272	+ 209	47½	153,691	+ 6,939
Oldham Corporation ...	Mar. 1	1,994	2.118	+ 124	49	107,797	+ 7,402
Portsmouth Corp.....	Feb. 28	1,597	1,847	+ 250	48	106,885	+ 7,130
Preston Corporation ..	,, 25	730	810	+ 80	48	42.172	+ 2,592
Provincial	,, 28	1,522	1,648	+ 126	21	36,859	+ 2,109
Reading Corporation ...	,, 26	622	629	+ 7	47	33,018	+ 2,318
Rochdale Corporation	,, 28	1,410	1,433	+ 23	48	76,253	+ 3,124
Rotherham Corp.....	Mar. 4	879	877	— 2	48	48,791	+ 9,853
Salford Corporation ..	,, 2	4.880	5,083	+ 203	48	250 694	+ 11.611
Sheffield Corporation...	,, 1	7,049	7,476	+ 428	49	360,204	+ 26,147
Southampton Corp.	Feb. 25	1,044	1,151	+ 107	47	61,996	+ 3,372
Southend-on-Sea Corp	,, 25	544	704	+ 160	43	43,907	+ 7,564
South Met. Trys.	,, 27	697	1,006	+ 309	9	8,072	+ 2,238
South Shields Corp.....	,, 28	601	699	+ 98	48	34,474	+ 3,977
Sunderland Corp.....	Mar. 1	1.213	1 336	+ 123	48	69,090	+ 6.251
Sunderland District ...	Feb. 28	529	602	+ 73	17	9.674	+ 1,116
Swindon Corporation ...	,, 25	138	159	+ 21	47	7,827	+ 436
Trys. (M.E.T.) 'Buses	,, 28	862	8,706	+ 7,844	9	63,437	..
Tyneside Trys. & Tmrds	,, 25	486	488	+ 2	8	3,731	+ 124
Wallasey Corporation	,, 24	979	1 093	+ 114	48	57,815	+ 5,259
Walsall Corporation	,, 28	593	609	+ 16	9	5 181	+ 113
Walthamstow U.D.C....	,, 28	634	704	+ 70	48	35,483	+ 1,490
Warrington Corp	,, 26	424	433	— 2	49	21,158	+ 412
West Ham Corporation	,, 26	2,502	2 627	+ 125	47	139,036	+ 4,139
Wigan Corporation	,, 25	1,313	1.439	+ 126	47½	70,859	+ 6,438
Wolverhampton Corp	Mar. 4	999	1,016	+ 17	49	52,467	+ 2,634
Yorkshire (W. Riding)	,, 1	1,293	1,491	+ 198	9	12,863	+ 1,113

* From such of the services as were working both last year and this year the receipts show an increase of £2,377 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London.....	Feb. 28	£5,304	£5,050	— £254	9	£46,590	— £3,035
City and South London	,, 28	2.946	2,848	— 98	9	25,724	— 1,904
Liverpool Overhead.....	Mar. 1	1,566	1,608	+ 42	9	14,837	+ 514
London Electric.....	Feb. 28	14.200	14,420	+ 220	9	131,335	— 495
Mersey	,, 28	2.263	2,294	+ 31	9	20,454	+ 65
Metropolitan	Mar. 1	15,865	17.632	+ 1,767	9	161,408	+ 13,962
Metropolitan District	Feb. 28	13,062	13.519	+ 457	9	119.053	+ 8

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TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, March 6.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	— 1	70½ — 72½ xd
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref	— ½	4⅛ — 5⅛
5	Do. 5½% Cum. 2nd Pref.	...	4⅜ — 4⅝
100	Do. 4% Deb. Stk. Red.	+ ½	93 — 95
100	Do. 4½% Deb. Stk. Red.	...	97 — 100
100	Do. 5% Deb. Stk. Red.	...	96½ — 98½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 — 106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅝ — ¾
1	Do. 5% Cum. Pref	...	⅝ — ¾
100	Do. 4½% 1st. Mort. Deb. Stock, Red.	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	+ 1	86 — 88
1	Blackpool and Fleetwood Tramroad Co.	...	14 — 15
	Bombay Elec. Supply and Trams. Co., Ord.	...	13½ — 14¼
10	Do. do. 6% Cum. Pref.	...	10¾ — 11¼
100	Do. do. 4½% Db. Stk Red.	...	94½ — 96½
$100	Brazilian Traction Light and Power Co. Lim.	— 2½	87 — 89
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	...	7½ — 8½
5	Do. do. 5% Cum. Pref	...	4⅞ — 5⅜
100	Do. do. 4½% 1st Deb Stock, Red.	...	98 — 101
10	Bristol Tramways and Carriage Co.	...	7 — 7¼ xd
10	Do. do. 4% Cum. Pref.	...	7 — 7⅝
100	Do. do. 4% Deb. Stock	...	100 — 103
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	— 3½	116¼ — 120⅝
100	Do. Pref. Ord. Stock	...	106 — 110
100	Do. 5% Cum. Perpetual Pref. Stock	...	103 — 106
100	Do. 4½% 1st Mort. Debs.	...	98 — 101
40	Do. 4½% Vancouver Power Debs.	...	94 — 98
100	Do. 4½% Perpetual Cons. Deb. Stk.	...	96 — 98
100	British Elec. Traction Co., Lim., 6% Cum. Pref.	— 1	89 — 92
100	Do. 7% Non-Cum. Pref.	— 1	56 — 59
10	Do. 6% Pref. Ord. Non-Cum.	— ½	15¾ — 17¾
100	Do. Deferred Ord. Stock	— ½	6¼ — 8½
100	Do. 5% Perpetual Debenture Stock.	+ 1	95 — 98
100	Do. 4½% Second Debenture Stock, Red	...	80 — 83
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	73 — 78
100	Buenos Ayres Lacrose Trams. Co., Stg. 5% 1st Mrt. Deb.	+ 1	100 — 103
5	Calcutta Tramways Co., Limited. Ord.	+ ¼	6¼ — 6¾
5	Do do. 5% Cum. Pref.	...	5 — 5¼
100	Do. do. 4½% 1st Deb. Stock, Red.	...	96 — 99
1	Cape Electric Tramways, Ld.,	...	⅜ — ⅝
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	3 — 3¾
100	Do. 5% Debs. Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co. (1904), Lim.	— ⅛	5¼ — 5½ xd
100	Do. 4% Debenture Stock Red, 1935	...	91 — 96
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.	...	89 — 93
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	— 1	93½ — 95½
10	Cork Electric Tramways and Lighting Co. 6% Cum. Pref.	...	6⅞
10	Dublin United Trams. Co. (1896) Lim. Ord.	— ⅛	11⅞
10	Do. do. 6% Pref.	— ⅛	19⅜
100	Do. do. "A" Red.	+ 1	81
100	Do. do. Deb. Stock "B" Red.	+ 1	79
10	Gateshead & Dist Trys. Co., Ord.	...	8¾ — 9¼
10/-	Hastings & Dist. Electric Trams. Co., Ld., Ord.	...	½ — ¾
1	Do. do. 6% Cum. Pref.	...	⅝ — ¾
100	Do. do 4½% Deb. Stk. Red.	...	67 — 72
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	93½ — 97½
5	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)	...	86 — 90
10	Imperial Tramways, Ord.	...	3 — 3½
10	Do. do. 6% Cum. Pref.	...	6¼ — 6¾
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.	...	2 — 2½
100	Do. 4% Debenture Stock	...	71 — 76
1	Kalgoorlie Elec. Trams., Ltd.	...	0 — 1/16
100	Do. do. 5% "A" Deb. Stk.	...	85 — 90
100	Do. do. 6% "B" do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.	...	⅞ — 1
10	Lanarkshire Tramways Co.	...	9¼ — 10¼
100	Lancashire United Tramways, 5% Prior Lien Deb.	...	85 — 87
1	Lisbon Electric Trams., Lim., Ord.	...	1⅛ — 1⅜
1	Do. 6% Cum. Pref.	...	1⅛ — 1⅛
100	Do. 5% Mort. Debs.	...	91 — 96
1	London and Suburban Trac. Co., Lim., Ord.	...	⅜ — ½
100	London General Omnibus Company, Limited, 4½% Deb.	...	97½ — 99¾
100	Do. Do. 5% Cum, Inc. Deb. Stk. Red.	...	89 — 92
100	London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red	...	63 — 67¾
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref.	...	5 — 5⅝
5	Do. do. 5% Deb. Stk., Red.	...	101 — 103
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	79 — 82
$100	Manila Electric R. R. and Lighting Corp. Capital Stk.	— 1	111 — 114½
$1,000	Do. do. 5% Bds.	— ½	98¾ — 100
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	+ 1/32	1 1/16 — 1 1/8 xd
100	Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red.	— 1	92 — 95
100	Do. 5% Deb. Stock, Red.	...	90 — 93
100	Mexico Tramways Co., Common Stock	+ 3	73 — 75
500	Do. Gen. Con. 1st Mort. Gld. Bonds	+ 1¼	80 — 84 xd
100	Do. 6% 50-yr. Mort. Bonds	+ 2½	80 — 85
...	Michigan United Railways 5% 1st Mort. Gld. Bonds	...	91½ — 93½
100	Montreal Street Railway, Sterling 4½% Debs. (1922)	...	98 — 100
100	Do. 4½% Sterling Debs, (1922)	...	99 — 101
1	National Steam Car Co. Ltd.	...	1/16 — 1/8
10	Oldham—Ashton and Hyde Elec. Ord.	...	5⅜ — 6⅞
10	Do. do. 5% Cum. Pref.	+ ⅛	5¾ — 6
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	4⅛ — 5¼
5	Do. do. 6% Cum. Pref.	— ⅛	4¼ — 4¾
1	Perth (W.A.) Elec. Trams., Ld., Ord.	...	—
1	Potteries Electric Traction Co., Ltd., Ord.	...	⅜ — ⅝
1	Do. 5% Cum. Pref.	...	13/16 — 15/16
100	Do. 4½% Debenture Stock, Red.	...	84 — 87
1	Provincial Tramways, Lim., Ord.	...	13/16 — 15/16
10	Do. 5% 1st Deb. Stock	...	95 — 98
...	Puebla Tramway, Light & Power Co., Prior Lien 5%	...	80 — 84½
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.	...	5 — 5¼
100	Do. do. 4½% 1st Mt. Db. Stk	...	95 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	89 — 91
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	— 1	99 — 101
100	Do. do. 5% 50-yr. Mort. Gold Bonds	— ⅛	91½ — 93½
100	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	— 1	99 — 102
$500	Do. 5% 1st Mort. Debs., Red., 1929	...	99 — 102
10	Shanghai Elec. Construction Co.	+ 1	13¾ — 18¾
100	Singapore Elec. Tramways Lim., 5% Debs. Red	...	88 — 93
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref.	...	⅛ —
100	Do. do. 4% Deb. Stk.	...	66 — 70
...	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	— 1	96 — 98
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	— 1	97 — 99 xd
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	83 — 85
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	93 — 95
5	United Elec. Tramways of Monte Video, Ord.	...	4½ — 5⅛
5	Do. do. 6% Cum. Pref.	...	4¾ — 5¼
100	Do. do. 5% 1st Deb. Stk. Red.	+ 1	96 — 98
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	96 — 97
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	⅛ — ⅜
5	Do. do. 6% Cum. Pref.	...	3⅞ — 4¾
100	Do. do. 4½% 1st Deb. Stock, Red.	...	80 — 86

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

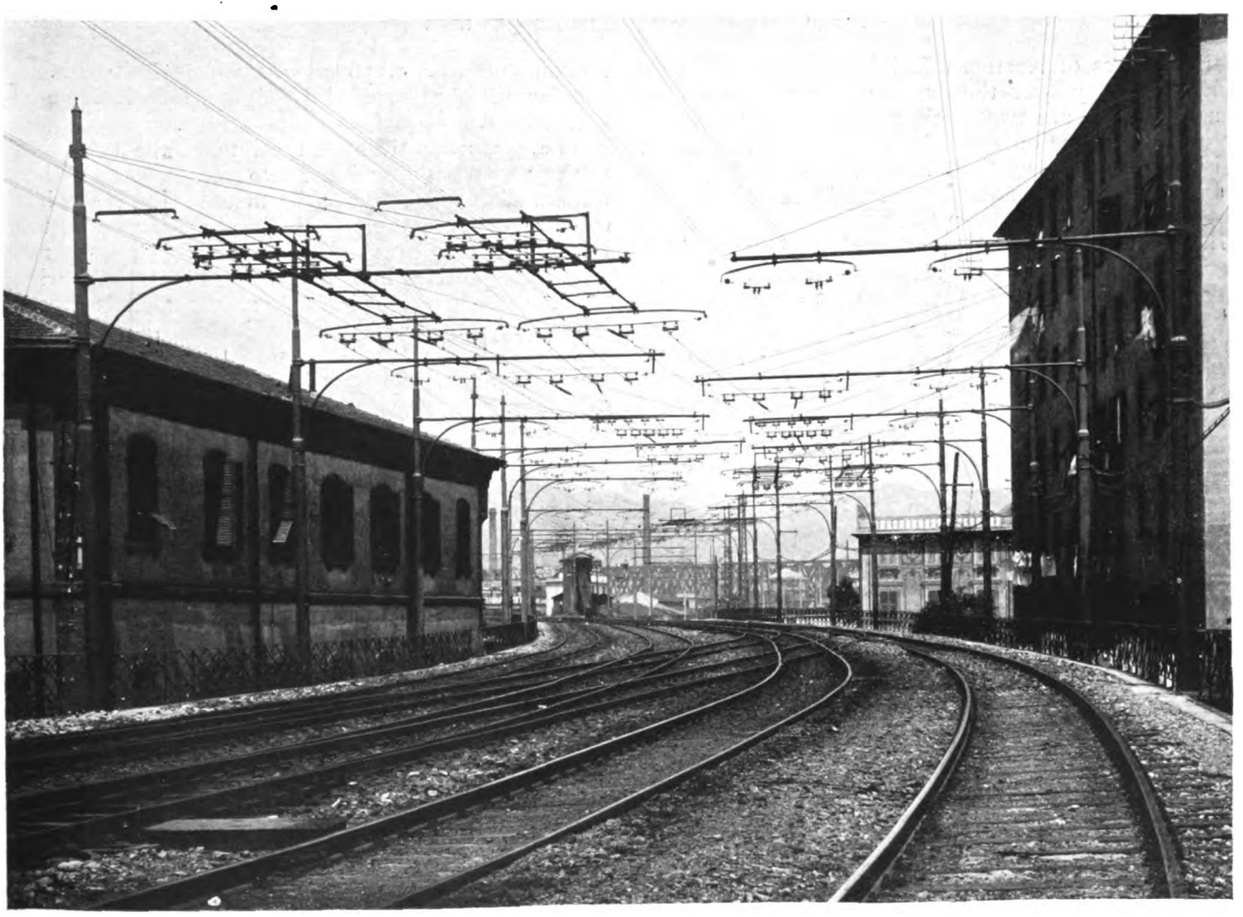
FOUNDED 1892. LONDON, MARCH 12, 1914. VOL. XXXV.

ELECTRIFICATION OF THE ITALIAN STATE RAILWAYS.

OVERHEAD EQUIPMENT OF THE GIOVI LINES NEAR GENOA.

So far as Great Britain is concerned the developments of electric traction upon main line railways have taken the direction of employing in nearly every case a third rail as conductor and continuous-current motors. Indeed, so far, the bold step taken by the London, Brighton, and South Coast Railway, in converting their suburban lines to electric traction upon a single-phase alternating-current system of line working, with overhead conductors throughout, constitutes the chief instance at present of such a method in regular service in this country: but its apparent success in working justifies extension, and it may be that in future more examples of the system will be put into operation upon long-distance runs, as well as for sections where traffic is heavy and junctions numerous.

The Italian railway authorities, perhaps partly because of the success of three-phase alternating-current working upon the Valtellina line, have continued to install the same system on other lines in preference to third-rail continuous-current working, and we have now to record the progress of further stages in the equipment of the main lines of the Italian State Railways near Genoa for electric traction, with overhead conductors and alternating-current motors.



Overhead Work at the Torbella Crossing, near Rivarolo Station.

We have already (see THE TRAMWAY AND RAILWAY WORLD for May 5, 1910) given a short illustrated

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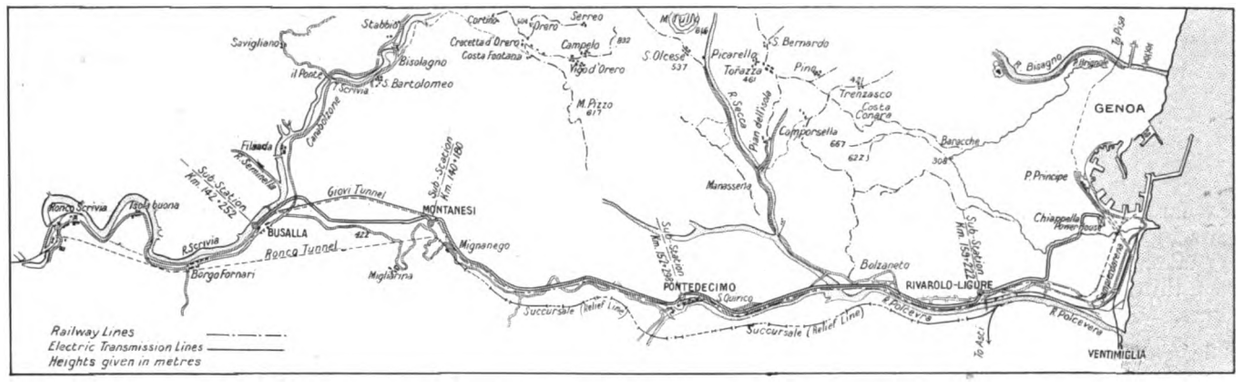
description of part of this work, including details of the extremely interesting and powerful electric locomotives employed on the sections of line completed. From particulars recently given in the official journal ("Rivista Tecnica") of the Italian State Railways, we condense the following account of the latest developments, hoping later on to complete our record when the entire network is equipped, according to the aim and ambition of the highly progressive engineers responsible for working out the scheme.

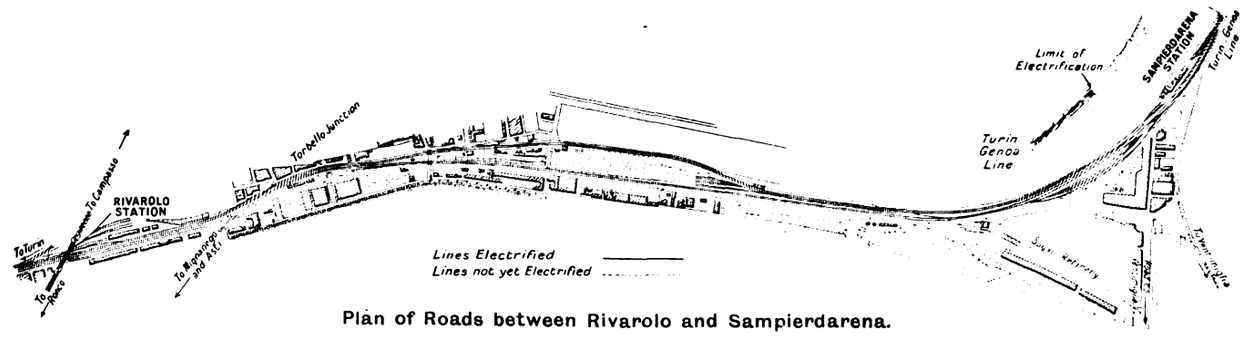
As may be seen from the accompanying sketch maps, the position of the main lines running into the port of Genoa from Turin, Milan, and other important



The Old Giovi and the Succursale, or Relief, Line from Sampierdarena.

inland centres of Northern Italy, traverses some very difficult country over the first 12 or 15 miles out of Genoa. There are two distinct lines from Genoa as far as Ronco, one on each side of the river Polcevera, and both of them cutting through the hills between and beyond Busalla and Montanesi by means of long tunnels with very heavy grades.

In addition, the line on the right bank, which carries most of the goods traffic and is known as the Succursale (branch, or relief line), has a number of short tunnels upon it which militate very strongly against its use for passenger service by steam locomotives. The track on the left bank of the river is known as the old Giovi line; this was first converted to electric traction, and is now completely equipped from Busalla through the long Giovi tunnel, past



Plan of Roads between Rivarolo and Sampierdarena.

Montanesi, Pontedecimo, and Rivarolo Junction into the two main stations of Genoa—Campasso (goods) and Sampierdarena (for passengers).

Eventually it is intended to continue electric working from the latter stations into and across Genoa to Brignole, and from Sampierdarena, where there is a Y curve, westwards to Ventimiglia along the coast. Part of this last section, from Savona to Ceva, is already equipped. The short section from Busalla to Ronco on the old Giovi line is being taken in hand, and most of the equipment work on the branch line or "Succursale"—on the right bank of the river—is actually completed between Ronco and the junction with the old line near to Genoa, so that very shortly the entire section embodying two separate double tracks between Ronco and Genoa on both sides of the river will be operated by electric locomotives, with greatly increased speed of working as well as a much higher capacity of train load.

The new method of traction has already practically doubled the tonnage per hour of the line where at present working. The average trains consist of 21 wagons of 18 tons each. The line is divided into three sections, and the trains run at intervals of 15 minutes. With a period of 18 hours per day there are, therefore, 1,058 wagons running over the line, or with a period of 20 hours per day, 1,176 wagons can be dealt with. At a 10 minutes' interval these figures are increased by 50 per cent.

The 40 locomotives for the line, of the type shown in the accompanying illustration, represent the latest developments in three-phase machines. Each has a capacity of 2,000 H.P., and a total weight of 60 tons; this, of course, represents an output of 33·3 H.P. per ton. These locomotives have five coupled axles with wheels of 42 in. diameter. The two axles at each end have a lateral play of $\frac{7}{8}$ in. The central wheels have no flange—an arrangement which allows the locomotives to run freely round curves of very small radii without difficulty.

As delivered, the new Giovi locomotives were designed for freight service, and for a normal speed of 28 miles per hour. They are, however, also used for passenger service, as their speed capacity is as high as it is considered safe to work on the Giovi line. They have, in addition, a 14 miles per hour speed which is used for shunting purposes and for generating power when the train is running down hill.

Trains of 418 tons, exclusive of locomotive weight, have been run at a speed of 28 miles per hour up the grade from Pontedecimo to Busalla, a distance of $6\frac{1}{2}$ miles. On the down grade, as mentioned, the speed is 14 miles per hour, the locomotive being connected for regenerating power. During the original tests after 20 hours' continuous operation, one round trip without

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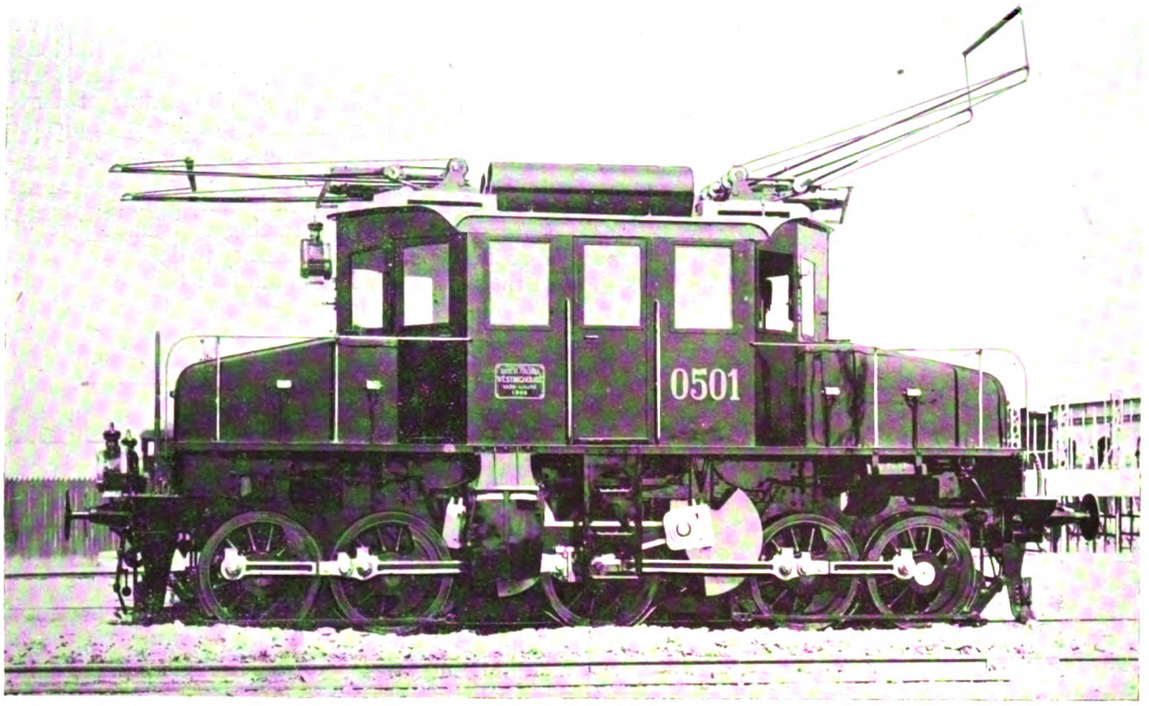
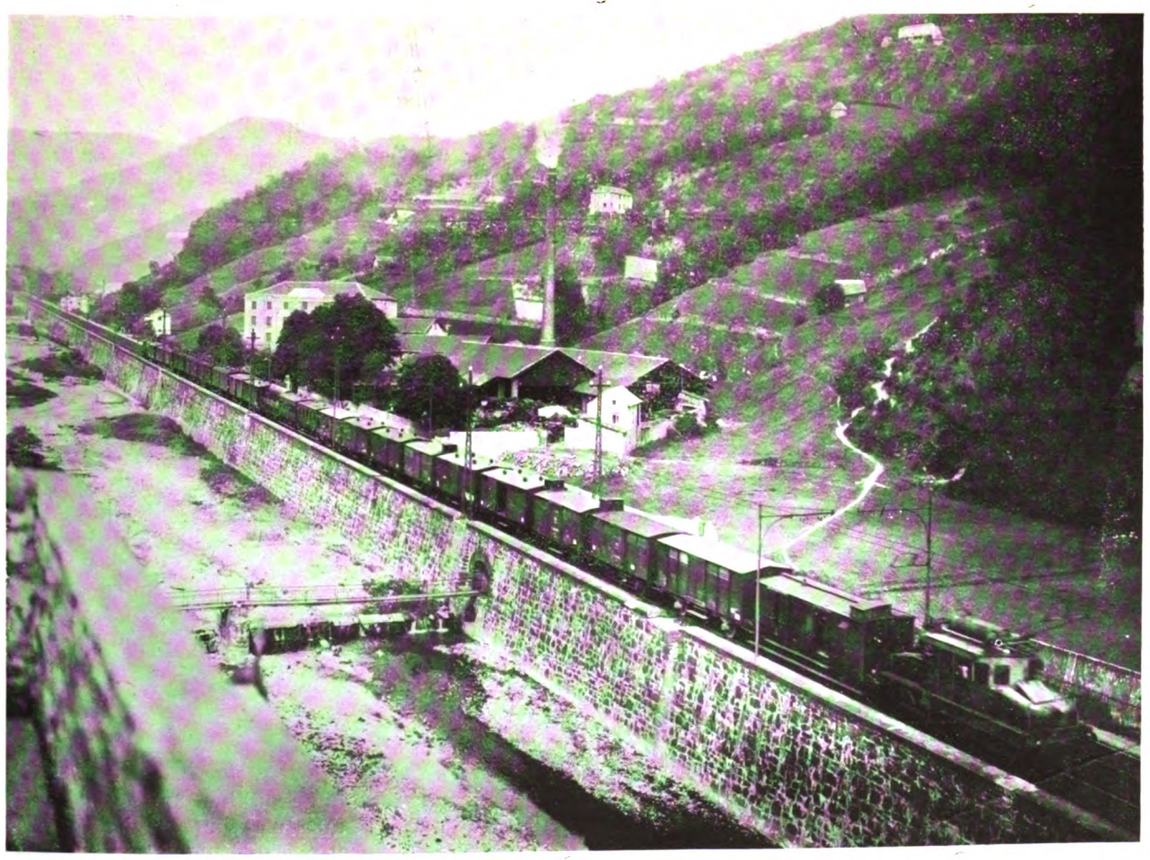


Three-Phase Locomotive of the 0-5-0 Class Used on the Giovi Lines of the Italian State Railways.

forced ventilation of the motors was made with a temperature rise of the motors to somewhat less than 167 deg. Fahrenheit. The one-hour motor rating for the same temperature is 720 H.P. per motor, corresponding to a locomotive pull at the wheel circumference of 19,500 pounds. The friction rating under the most unfavourable conditions is such that a train of 380 tons, exclusive of the locomotive, can be accelerated to 28 miles per hour in less than 200 seconds by two locomotives, one pushing and one pulling, on a grade of 1 in 28·6, and on a curve of not less than 1,200 ft. radius. The maximum starting torque is such that the



A Train of 380 Tons Ascending a Gradient of 1 in 30 on the Giovi Line

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motors can revolve the wheels of the locomotive, with its weight increased to 75 tons, while the locomotive is kept stationary.

The motors are three-phase, 3,000-volt, 15-cycle machines, arranged to run in cascade and parallel,

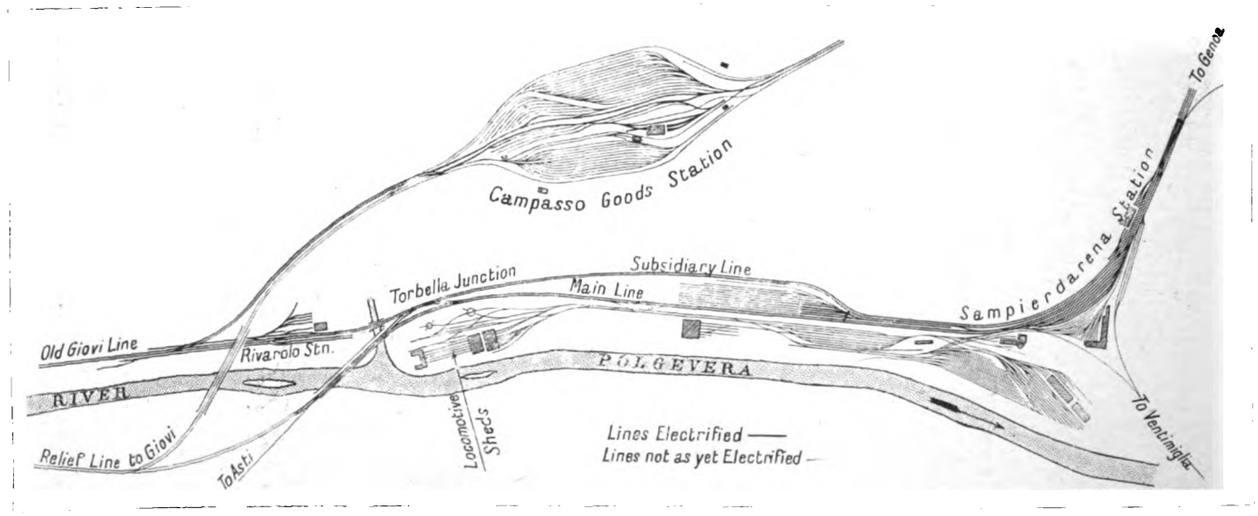
Three-Arm Semaphore near Curved Station at Sampierdarena.

giving two synchronous speeds of 112½ and 225 revolutions per minute. Intermediate speeds are obtained by inserting rheostats in the circuit. The motors have double bearings, the outer of which is built into the main locomotive frame and carries the reactions of the frame; it also takes the thrust of the connecting rods, and is provided with springs to take up all motion or change of position due to shocks, weight of ballast on locomotive frame, etc. The inner bearing carries the motor, and has for its special function the maintenance of the air gap, so that the motor itself is entirely independent of any motion of the locomotive frame. The mounting of the motors on the locomotive is accomplished from below by means of a hydraulic lift. The complete changing of a motor, including the connection to the side rods, may be easily done in two hours.

The control system embraces a number of excellent features. Since the starting resistances are of water rheostat type, it was necessary to design the secondaries of the motors for low potential; this was also desirable in order to have low potential on the slip rings. The low potential secondaries involve, however, the possibility of connecting one of the motors in cascade connection. The switch performing this reconnecting of one of the stators from high to low voltage is the only switching mechanism in the system, which has numerous contacts for heavier currents. It can in this respect be compared with either the auto-transformer tap switch of the single-phase system and poly-phase systems with squirrel-cage rotors, or with the resistance distributing switches of systems using metallic starting resistance; but its practical operating characteristics are much superior. Since it is always operated without current the necessary care and cost of maintenance is reduced to less than 10 per cent. of that of the other switches mentioned, and it may be operated by only two relays, while the others, under master-switch control, require relays for all tappings.

The wiring required in connection with the potential changing switch is reduced to a minimum by mounting the switch directly on the motor and handling it as a unit therewith. The switch extends into the cab of the locomotive from below, and may be readily inspected by removing the protecting cover.

The use of the water rheostat is one of the main advantages of the control system. It eliminates all metallic resistance parts, which are always more or less subject to burn-outs and mechanical breakage. Moreover, all contacts that have to be operated under current in the secondary are eliminated, excepting the one contact which short-circuits the rheostat. On this contact, however, there is no arcing and burning, since it operates only when the water rheostat is about zero.



Outline Map of Sampierdarena and Adjacent Lines, Showing Old Giovi Line.

A further advantage of this control lies in the fact that it does not increase the current by steps, but allows for the finest possible regulation.

The water receptacle is a tight tank so mounted as to extend below the cab for air cooling. Receptacles

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Overhead Work in the Station Yard Under Construction in July last.

Looking toward the long Succursale Tunnel--The Busalla Line is seen on the Left.

VIEWS AT RONCO STATION.

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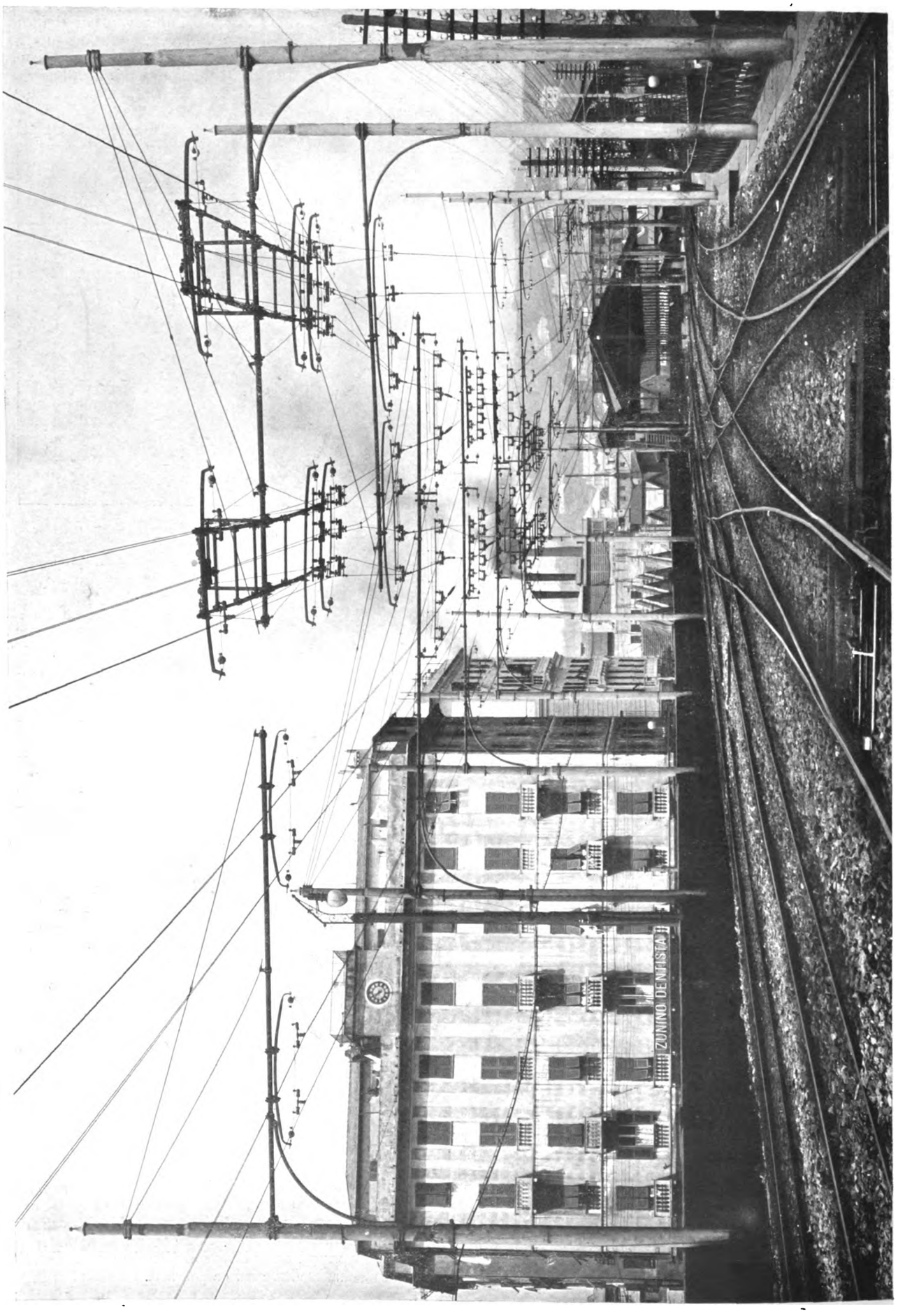

Part of the Crossing on the Viaduct as seen from the Genoa Side

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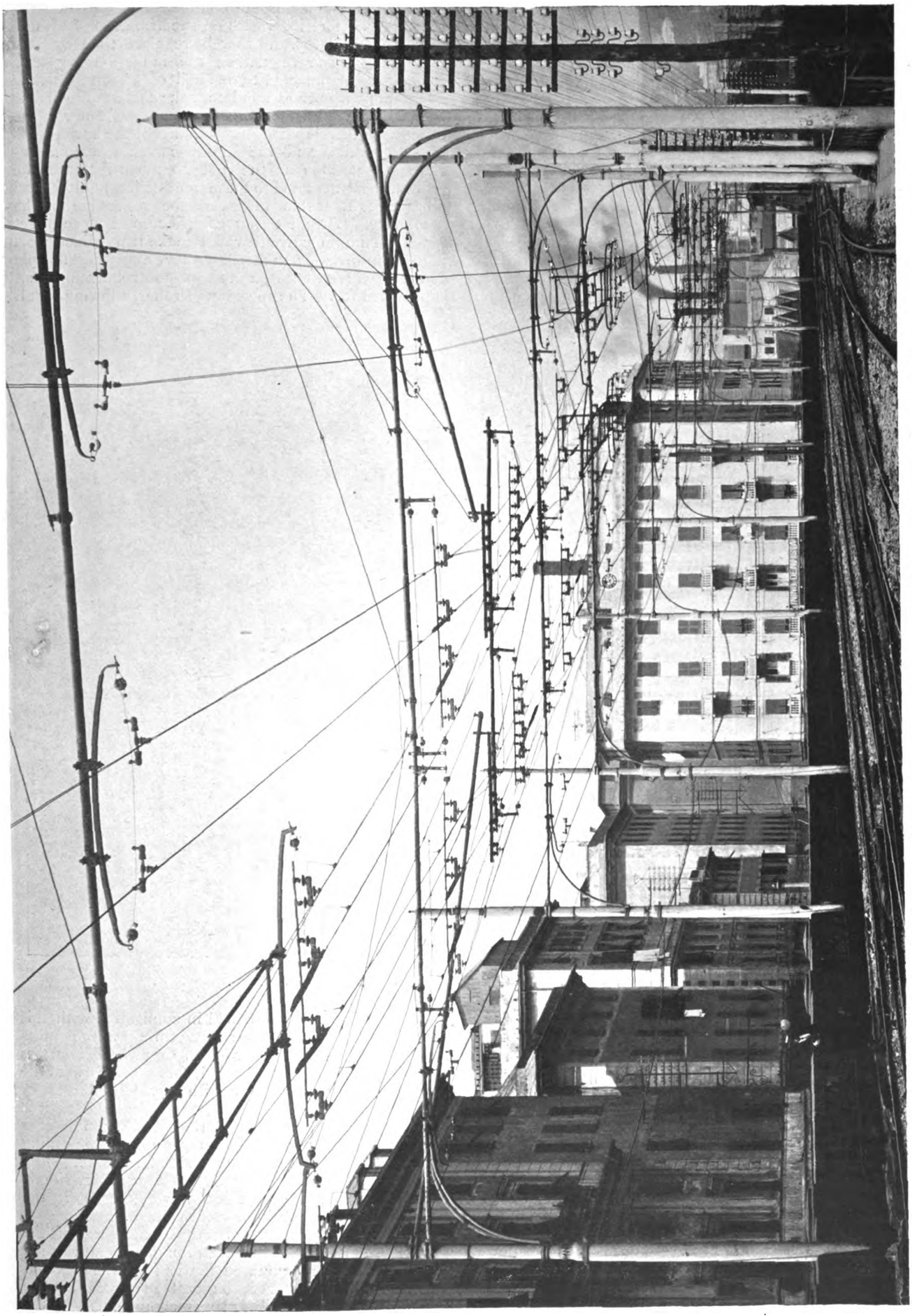

Another View of the Crossing on the Viaduct.

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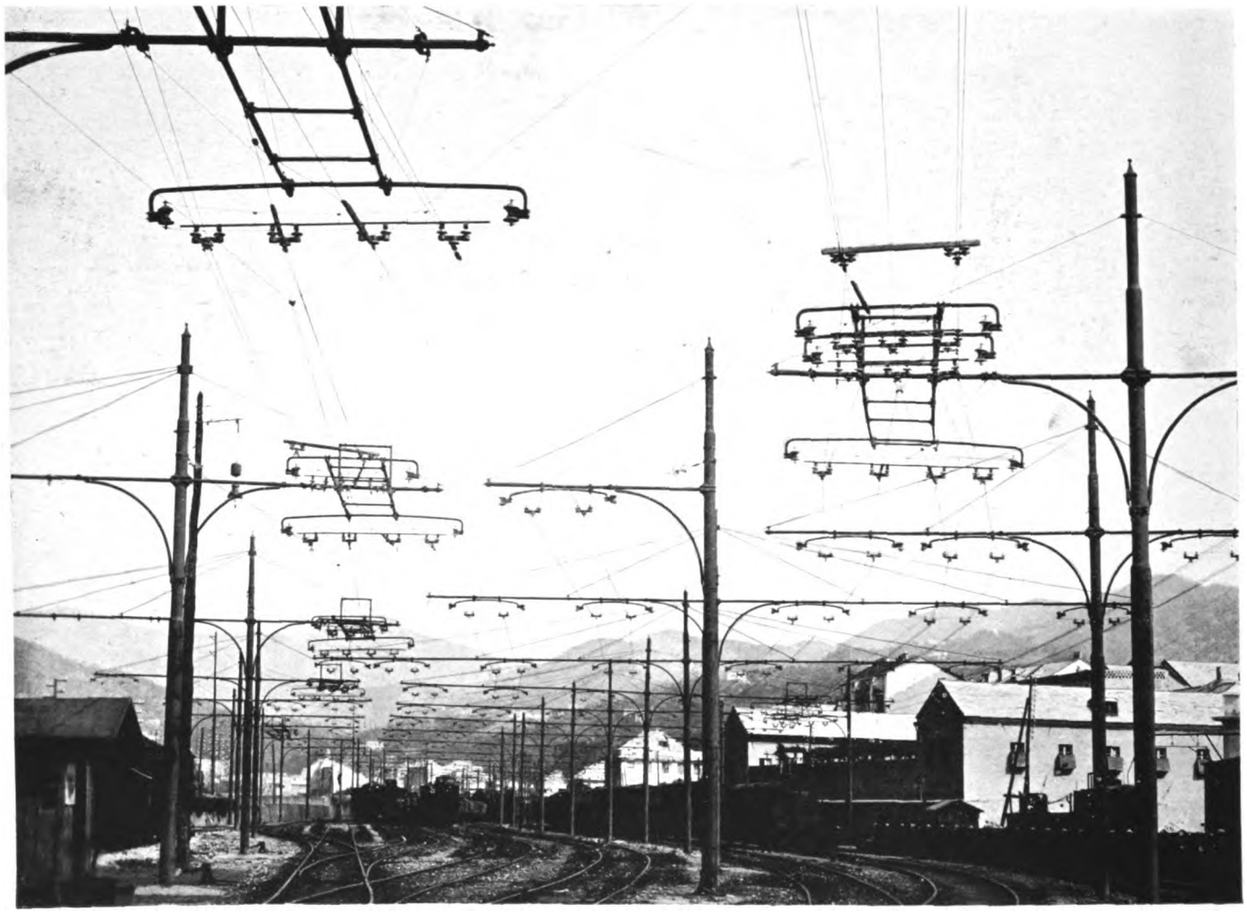
for the electrodes extend from below the water level, through the cover and up into the lower parts of the locomotive, the electrodes being supported in the upper portions of these receptacles or cylinders. In operation, the height of water in the cylinders is regulated by air pressure in the upper part of the tank, which forces the water up into the cylinder, and the regulating mechanism extends into the cab proper, and can therefore be conveniently inspected after the removing of a protecting cover.

The only switch that is interrupted under current is the primary switch, but even for this switching conditions are very favourable, as the current to be interrupted in the primary of induction motors with wound secondary may be reduced practically to the magnetising current by first inserting resistance into the secondary, and then breaking the primary current.



Overhead Construction at a Group of Lines at Sampierdarena.

For this reason it has been found possible to use switches which, after an operation of two years, are still in good working condition. The excellent feature of the primary of the Giovi locomotive is that it serves as both an interruption switch and a reversing switch, without requiring any additional contacts for the reversing. This is accomplished by simply rotating the movable contact parts through a certain angle, in order to reverse the motor.

The master switch is arranged for two levers. One of the two levers has four definite positions, corresponding to the two speeds, to move forward and backward. The second lever regulates the current consumed by the motors. Every position of this lever determines positively the certain maximum current to be taken by the motors. Any time the motor tends to take current larger than corresponding to the lever position, resistance is automatically inserted into the secondary. The lever acts on the armature of a small induction regulator, and thereby regulates the secondary potential of the regulator; the induction regulator secondary is connected to one coil of a relay, which is counteracted by the second coil, the current of which is proportioned to the motor current. Whenever the effects of the relay coils are balanced, the armature is in the middle, and the motor currents remain unchanged; as soon as the motor current increases the armature is attracted by the one coil, and closes the relay circuit, which increases the resistance in the secondary. The fact that each locomotive can be set for a maximum current would make it possible to use the locomotives in multiple without a special multiple control. Nevertheless, a multiple-control arrangement is provided for. The special controller, allowing for all desired conditions, is provided in connection with this system. The multiple-control system not only permits the operation of locomotives of different wheel diameters in multiple and equally loaded, but also permits the loading of them differently with any desired ratio of load distribution. This is a great advantage, as it is frequently desirable to keep the drawbar pull of a pulling engine within certain limits, and let the pushing engine take care of the greater part of the load.

The coils operating the valves are of a very simple design, and work exceptionally well, even if the potential drops to half its normal voltage.

An important feature—already alluded to—of the three-phase installation has been found of great value in the utilisation of regenerated power from the descending trains; this reduces the cost of operating the line, and also reduces, by proper arrangement of the

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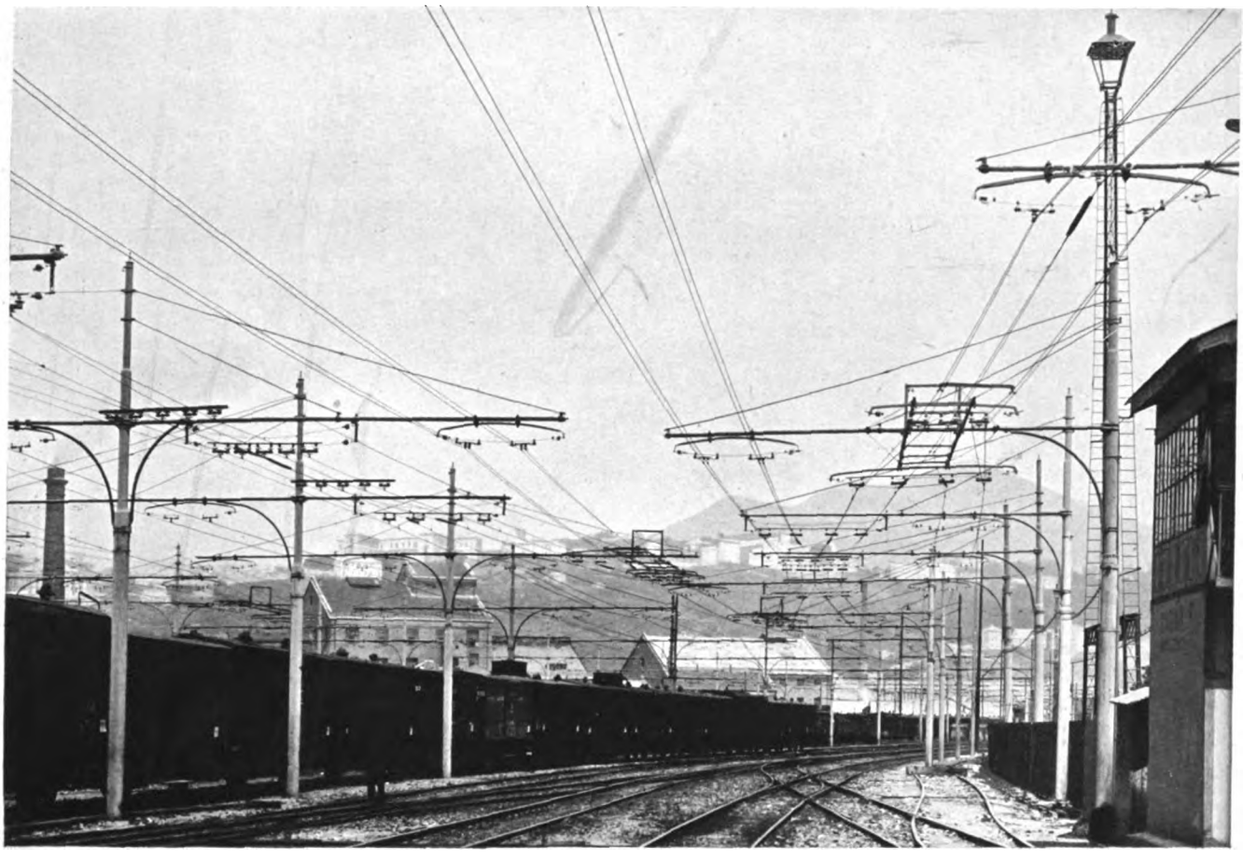
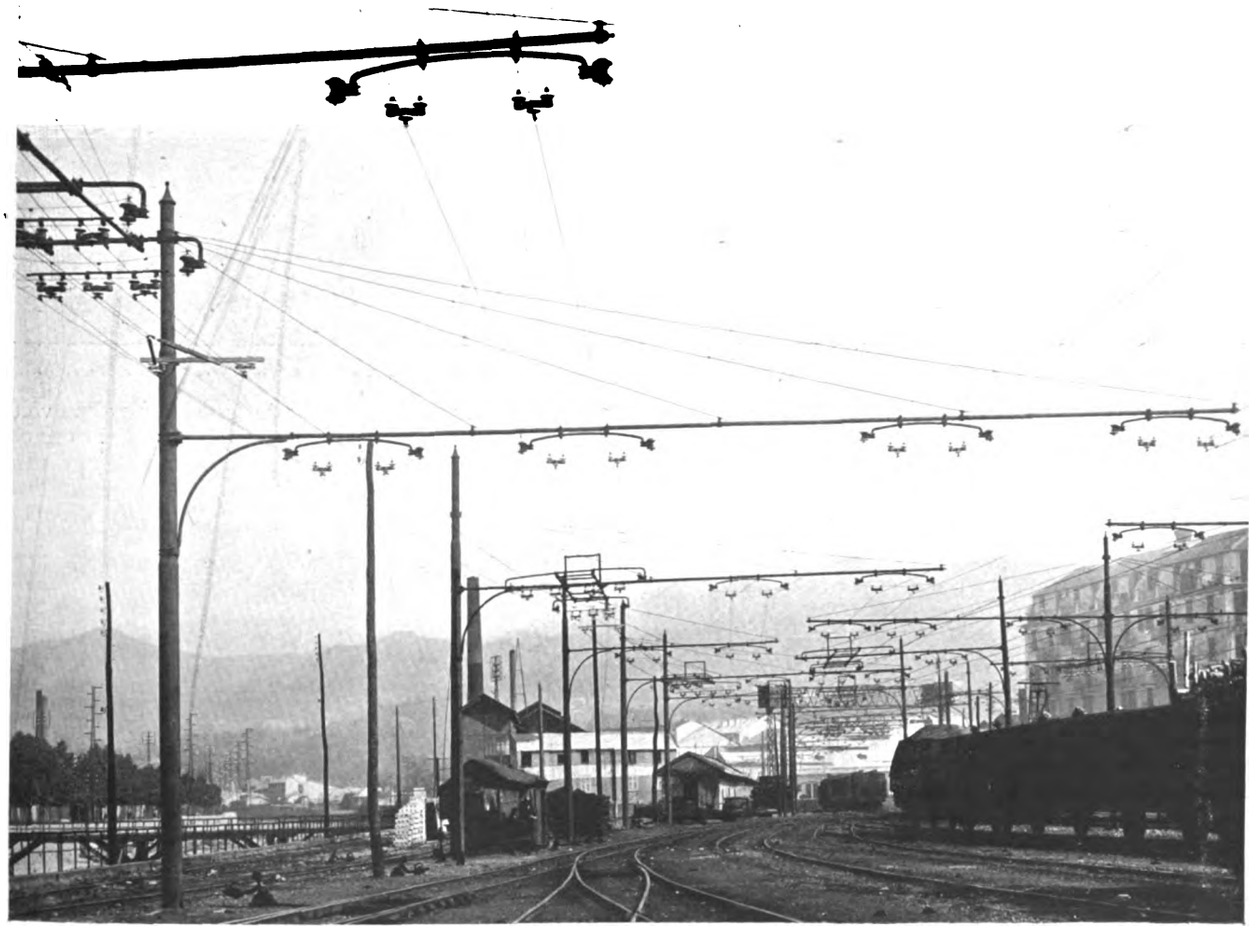


Part of Curve at Sampierdarena Station, Showing Use of Single and Double Bracket Poles.



A 16-Metre Arm for Four Roads at Sampierdarena.

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schedules, the peak of the load in the generating station, further avoiding the use of mechanical brakes when the train is going down grade.

The pantograph arrangements are also very simple. The single bow with two bronze cylinders insulated from each other and revolving in ball bearings engages both overhead wires. The use of the rolling contacts is very favourable for the contact wire, and has given good results on the Valtellina line, where it has been in use for over 10 years. On this line the rolling contacts were changed after an average of 25,000 loco-kilometres (not including shuntings), with a current often greater than 200 amperes per contact. In the Simplon tunnel, where sliding contacts are used, they were changed after 2,700 loco-kilometres on the average. This great difference is due to the fact that the contact point on the rolling type is changing very rapidly, so that the melting of the metal which reduces the life of the contact on the sliding type is not possible.

The construction of the trolley line is identical with that actually in service on the Simplon line. It consists of two wires of $\frac{5}{16}$ in. diameter, suspended over the centre of each of the two tracks, supported by transverse wires carried upon steel poles placed upon each side of the track. The rails are electrically bonded and connected with the sub-stations, and serve as a third conductor.

By the courtesy of the "Italian State Railway Review," we are enabled to reproduce an interesting series of photographs of the overhead work, and it will be seen that they convey a very clear idea of the highly complicated arrangements rendered necessary upon the cross-overs and junctions outside the station of Sampierdarena. The structure in the station itself presents marked features of interest owing to the lines at this point—indeed, the whole station itself—being on a large curve which has led to some difficulty in erection of poles, etc., so as to leave the view of signals perfectly open and clear to incoming or outgoing trains. Moreover, on the four-track viaduct east of Sampierdarena station, great care had to be taken to avoid cables, conduits, and conductors already laid in position along the line, so that the erection of each mast offered a separate and distinct problem when considering also the requirements of traffic over a restricted area with very extensive through train movements as well as heavy shunting.

All these difficulties have, however, been satisfactorily overcome, and the Tarbella crossing, where four double tracks converge, is notable as being one of the first to be constructed and worked on the three-phase overhead system without limitation of speed. Other illustrations represent the construction carried out at Ronco station—the present terminus of the electric section—and the point where the two double tracks from Genoa meet.

The transmission line consists of a double feeder cable from one extremity of the route to the other. It has been erected with all the latest improvements for the use of 13,000 volts. It feeds four transformer stations, situated on the route between Genoa and Ronco, at Rivarolo, Pontedecimo, Montanesi, and Busalla. Each of these consists of a small building of brick and concrete, containing a three-phase transformer of a nominal capacity of 3,600 K.V.A. of the oil type, reducing the current from 13,000 volts to 3,000 volts tension for feeding the overhead wires. The transformers, which are only designed for 13,000 volts, can, by a change of the connections, be adapted to 22,000 volts. When this change becomes necessary a third group can be installed in the central station, and three alternators arranged for working at 22,500 volts. The entire line is divided into sections, and suitable measures have been taken to ensure an independent current supply to each of these sections so that in case of damage a section can be promptly cut out for repair without interference with the others.

Overhead Construction in Progress in July last at Ronco Station—On the Right is a Double Mast with 16-Metre Arm.

At the generating station, which is situated at Chiapella, on the harbour side in Genoa, the first installation comprised two groups of three-phase steam turbo-alternators, each of 5,000 KW., 13,000 volts, 15 periods, each group being designed to carry an overload of 100 per cent. for five minutes. Space has been reserved for the installation of the third group above referred to. The work will soon be well in hand upon the construction of hydro-electric plants from which a supply of electricity will be obtained for operating these lines, and the Chiapella steam station will then be held in reserve as a standby.

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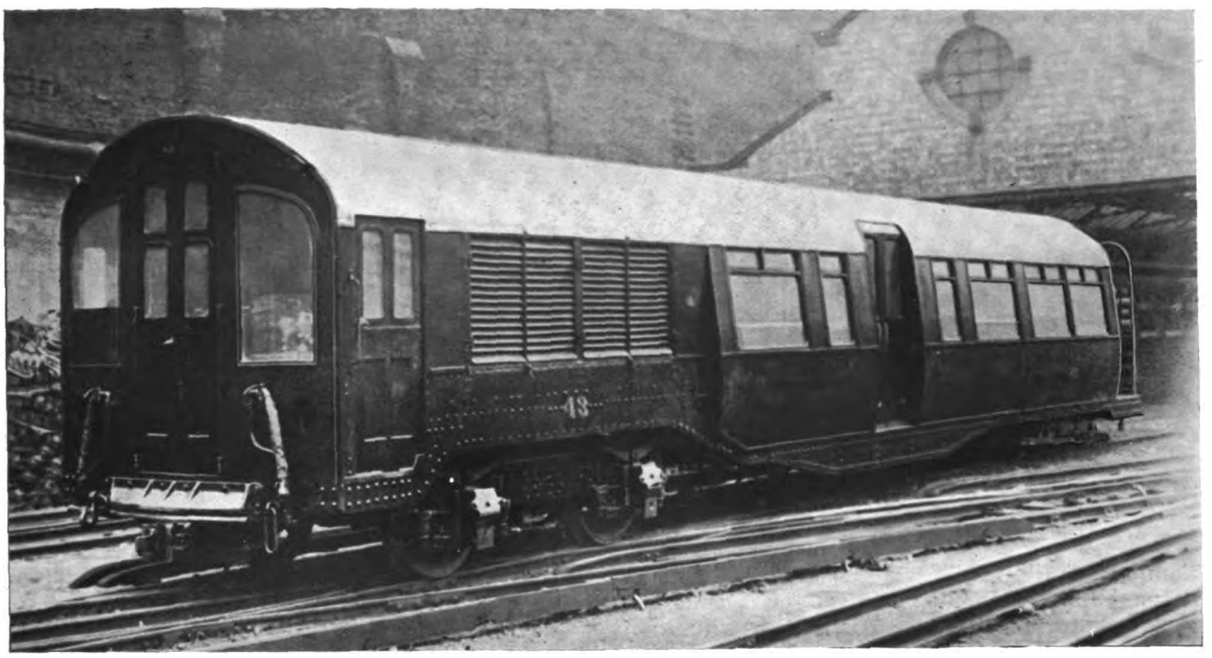
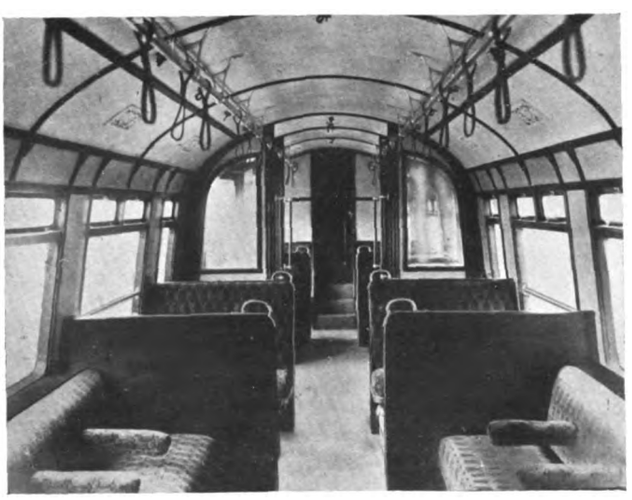
NEW MOTOR CARS ON THE BAKER STREET AND WATERLOO RAILWAY.

The extension of the Baker Street and Waterloo Railway to Paddington, which was opened at the beginning of December last, has necessitated the introduction of additional rolling stock in the shape of 10 new motor cars. The opportunity was taken of adopting several improvements which have been the result of experience with the existing rolling stock, and several innovations have also been introduced. For some time past experiments have been proceeding with the object of obtaining better riding rolling stock and also of designing additional doors to cars which will facilitate handling passengers at busy stations, and the results of these experiments have been embodied in these new motor cars.



New Type of Motor Car with Centre Doors—Baker Street and Waterloo Railway.

The cars are built entirely of steel, except for the window sashes, which are of mahogany, and this has been treated to make it fire-resisting. As will be seen from the photograph, the new cars have arched roofs instead of the familiar clerestory design. This increases the interior air space, and has the effect of increasing the apparent height and roominess of the car. It has also helped to make the introduction of middle doors easier without interfering with the roof. Not only are the interiors more pleasant, but the riding has been improved by the introduction of pads of anti-vibration material between the bolster springs and the spring planks. These pads have the effect of largely absorbing the vibrations of the gears and of the wheels on the rails, and preventing their transference to the car body.



Interior of New Motor Car.

As was explained by Mr. J. P. Thomas, traffic superintendent, at a luncheon, on the day of the trial run (February 11), experiments with middle doors on the tube cars have been proceeding for two years, and it is believed that the outcome of these experiments as embodied in the new cars is a very satisfactory design. The great trouble which has been experienced is to obtain a door on a tube car which has sufficient head room, but which does not leave a step on the outside large enough for a passenger to stand on in attempting to board a train in motion. The doors which have been adopted are twin doors, which swing inwards. The locking and unlocking of the doors is controlled by the gateman. When the train is running, the doors are locked and an electric indicator on the platform then shows a green signal to the gateman, who thus has the assurance that the central doors are properly locked. On reaching a station the gateman, in opening his gates, automatically unlocks the central doors by electrical connections, and a red indication is then shown in the signal. The central doors can then easily be opened by the passengers, and they close automatically. When the gateman shuts his gate, if the middle doors are closed, the locks drop and the green signal appears. If, however, the middle doors are still open, the red signal continues, and it does not disappear until the doors are closed, and the bolts are down. The central doors do not quite meet, but there is a rubber edging covering the aperture. It is thus impossible for the clothing of passengers to be caught

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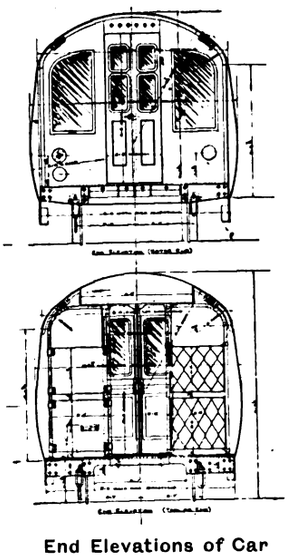
between the doors. There is a switch on the indicator box whereby the gateman can cut the middle doors out of operation, and can then work his gate independently while the same switch placed in another position will enable the gateman to lock and unlock his doors without affecting his gate. The doors are shut automatically by Bardsley door checks, made by Nettlefold and Sons, mounted under the floor of the car.

For lighting the cars in emergency, two circuits of five lamps each, in parallel, supply current to a relay. So long as the current flows in one of the circuits, the relay is held over, but if the current fails in both circuits, either through a lamp failure in these circuits, or through a general failure of the power supply, the relay cuts in a 12-volt accumulator, which supplies current to special lamps mounted in the roof of the car. Oil lamps have been dispensed with in the car tail lights, and an emergency lamp fitted in one of them, so that should the current fail, a red tail lamp is still available. Two tail lamps have been fitted, one on each side of the car.

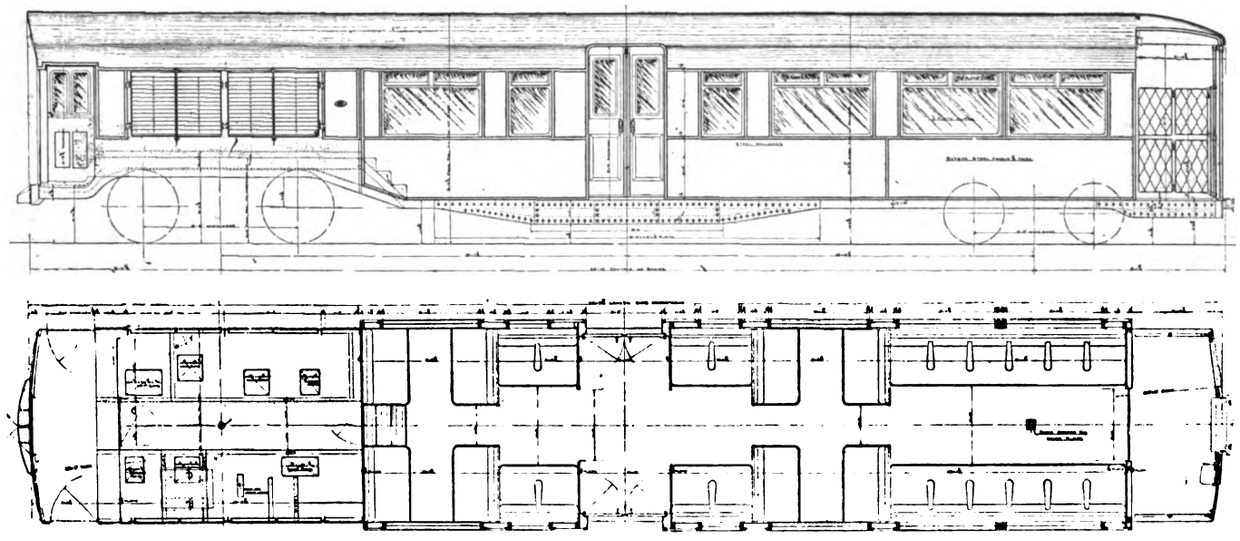


End Elevations of Car

The ventilation of a tube car with an arched roof proved a difficult problem. Owing to the small clearances between the car and the tunnel lining, extractor ventilators were out of the question. Ventilation has accordingly had to be arranged for by the use of air ducts running the whole length of the car, with apertures covered with grids over the ends. Grids connect these air ducts with the interiors of the car. The action of the car in running forces air through these ducts, and so into the body of the car, with the result that the ventilation is decidedly good.

The seats and backs are constructed of woven wire, and are upholstered in moquette velvet, and fitted with arm rests projecting from the seat backs. These seats are a great improvement upon those of rattan.

Another detail that will be appreciated is the replacing of leather strap hangers by a new sanitary strap recently introduced to the British market by Watlington and Company, of Britannia House, Milton Street, London, E.C. The strap is made of drawn steel tubing, covered with porcelain enamel, a type now extensively used in America and Canada, and it is certainly a great improvement. A sanitary fireproof jointless cement composition called "sanit," laid by the Sanit Fireproof Floor Company, is used as flooring, in place of wooden slats, and is laid on top of the steel flooring. This flooring is very much easier to keep clean than the old slatted flooring.



Plan and Elevation of New Baker Street and Waterloo Railway Car.

The electrical equipment of the cars is similar to that at present in use, except that G.E. 212 motors are fitted. These motors are of the same horse-power as the present G.E. 69, but they are fitted with interpoles. The lay-out of the equipment in the cab has been modified, as suggested by the results of experience on the old stock.

The car bodies were built by the Brush Electrical Engineering Company, the new motor trucks by the Gloucester Carriage and Wagon Company, and the new trailer trucks by the London Electric Railway Company, all to the design of Mr. W. A. Agnew, mechanical engineer to the London Electric Railway Company.

Ratepayers and Passengers Sharing a Deficit.—Unanimous assent has been given by the Stalybridge and District Joint Tramways Board to an increase in the minimum fare from a halfpenny to a penny, except for children. The latter are to be allowed to travel at half-fare between the ages of 3 and 14, instead of between 3 and 12. Alderman R. Wood, the chairman, in introducing the alterations, stated that up to the present time the lowest precept the ratepayers had had to find was £5,938, and it was felt that any other charge required should as far as possible be met by the users of the cars. They were practically carrying all the travelling public they could possibly carry. Among other things which rendered this change necessary was the increase in wages to the amount of £1,200 per annum. Repairs to rolling-stock would require an extra £500 a year for some years to come, and repairs and reconstruction of track would cost not less than £3,000 a year. Thus the next precept would probably be about £10,000.

Subways Proposed for Montreal.—Mr. G. Janin, chief engineer of public works, Montreal, has presented to the Board of Control a report upon the proposals for improving traffic facilities submitted by the Tramways Company and the Canadian Autobus Company. He states that it would be better to outline a general plan for improving the transportation facilities, and he submits a scheme for the construction of three subways with a total length of 8·21 miles, estimated to cost $20,600,000. Extensions of surface lines are also proposed. In Sherbrooke Street and other boulevards it is suggested that the tramways company should operate an omnibus service at a five-cent fare. The same fare would be charged on the subways. The company would be called upon to pay half of the interest and sinking fund on the city's part of the cost of the subways and tunnels.

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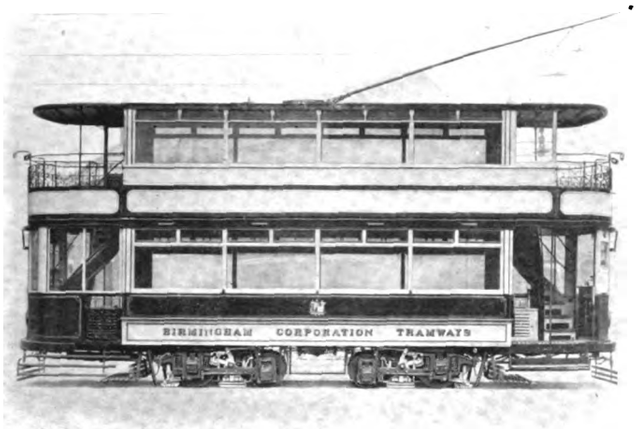
THE MALEY BRAKE FOR BOGIE CARS.

Readers are, of course, aware of the development of the Maley electro-mechanical track brake for four-wheeled cars. It is now some seven years since this brake was brought out, and both before and since then it has been the subject of much thought and work. The Electro-Mechanical Brake Company, of West Bromwich, have brought the appliance to a high degree of excellence, and they have now applied it to bogie cars in Birmingham. The small space available between the wheels, and the fact that the wheels carry unequal proportions of the weight on the truck, were special difficulties in adapting a really efficient mechanical track brake to maximum traction bogie trucks. That all the preliminary troubles have been overcome is shown by the fact that this brake is now in regular use on a large number of these Birmingham cars. As each of the vehicles weighs no less than 15½ tons unloaded, the necessity for a very powerful and reliable brake is manifest. Managers and engineers who can find time to visit Birmingham and inspect the working of the brakes on these heavy cars will discover much to interest them.



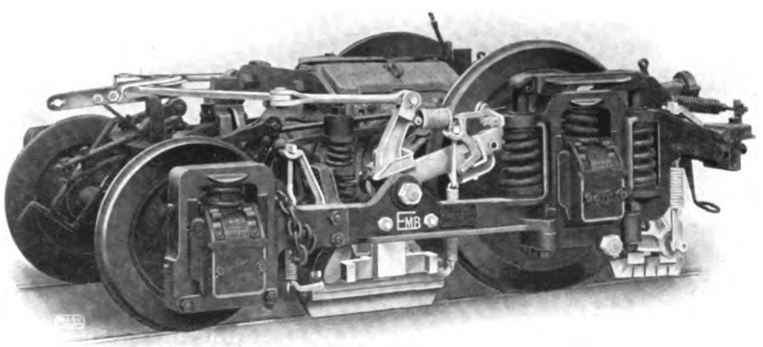
Birmingham Bogie Car Equipped with the Maley Brake.

The accompanying illustrations show the application of the Maley brake to bogie cars. A trial equipment was supplied in April last year to the Birmingham Corporation, and the results proved so satisfactory that an order for 75 similar brake equipments followed. The first of these were put into service in October last, and there are now some 40 in daily operation. These are proving as successful as the sample. The brake is used for service stops, for coasting, and for emergency stops. It has been possible to retain all the special features of this kind of brake as applied to four-wheel cars, the only difference being that each magnet operates one mechanical track shoe instead of two. It will be seen that the mechanical track shoe is in advance of the wheels and magnets, and cleans the rails for these, so that the actual braking conditions always approximate to those obtained with a clean rail. The weight carried by each mechanical track shoe is borne on a massive pin slightly in advance of each axle, but the actual fulcrum for the whole of the gear is the pony wheel. There is thus minimum tilting of the truck against the car body.

There are other special features, such as adaptation of the truck frames to receive the brake, which permits of a neat design of brake rigging. As will be seen, there are extremely few parts. The adjusting screw for taking up wear on the track shoes is enclosed in a grease-filled tube casting. All holes subject to wear are bushed, and wearing surfaces have hardened renewable plates, so that maintenance cost is reduced to a minimum. Special attention has been paid to lubrication and to accessibility, so that it is not necessary to take down any portion of the brake when overhauling motors or changing wheels.

As to the operation of the brake, this is carried out in the usual manner. The current output required from the motor being extremely small, service stops can be made from the controller without unduly loading the motors. The smoothest service stops or severe emergency stops are obtained according to degree of application. For coasting gradients, either the brake is applied from the controller or the application of mechanical shoes only by the hand wheel from the car platform is used, the latter usually being adopted, for such is its efficiency that with one and a half to two turns of the hand wheel the car can be kept under perfect control without assistance from the hand brake or the magnetic brake.

Another special feature of all Maley brakes is that the brake can be applied from the trolley circuit when required. This has often proved useful in those cases where the car is running too slowly to make use of the magnetic brake, and time would not suffice for the hand brake to be effective. By means of this trolley circuit application the condition of the brake gear can always be known, as, being independent of any work done on the motors, it affords a true test of the power of the brake. Another incidental feature of this arrangement is that it is really the only practical way of ascertaining the condition of the magnets. Any magnetic brake operated from the controller introduces the element of the braking effect due to motor reaction, so that it is nearly impossible to tell whether the brake or the motors are doing the work. Should the driver have any doubt as to the condition of his brake, it is only a moment's work for him to ascertain its exact efficiency, and, furthermore, the depot staff are also enabled to test the magnets in the same way on a stationary car.



The Maley Brake Applied to a Bogie Truck.

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LONDON, MARCH 12, 1914.

Three-Phase Traction.

Great extensions of the use of electric traction on British railways are now in prospect, and as "the battle of the systems" still goes briskly forward, special interest attaches to the account, to which a large part of the present issue is devoted, of the electrification of parts of the Italian State Railways that the government are carrying out with an enterprise and intrepidity that augurs well for the great and early improvement of the service. On a previous occasion we gave a short description of part of the work, but the present article conveys a more adequate idea of its growing magnitude. On all these railways which are being electrified the high-tension, three-phase, alternating-current system is employed. In this country there is not a single example of three-phase traction, nor does it find favour in America. Its home may be said to be in the Alps, and in adjoining mountainous districts on the Continent of Europe where water power is abundant. In England we have two examples of single-phase traction, namely, on the suburban lines of the London, Brighton, and South Coast Railway, and on the Morecambe and Heysham lines of the Midland Railway. While the three-phase alternating-current method has for many years been largely used for purposes of transmission to traction sub-stations, no such exclusive superiority has been established in regard to the kind of current to be applied to the motors on electric railways. Here and in the United States both direct-current and single-phase are used, while, as mentioned, the three-phase system is largely employed on the Continent. Leaving aside questions as to relative efficiency and suitability of the different systems to different conditions, the point to which we desire to draw attention is the complexity of the overhead wiring. All high-tension systems, of course, require overhead wire conductors. But while the direct-current and single-phase systems only need one overhead wire conductor for each track, the three-phase system requires two. Hence at junctions and sidings the overhead complication, when the three-phase system is employed, becomes excessive, and the cost of construction and erection must also be heavy. It is for the purpose of giving a realistic impression of how great is the complexity of the overhead work in the three-phase system on busy lines that we reproduce on a large scale a number of photographs showing this construction at various points on the Italian railways. Small reproductions would be of little use for the purpose, but the illustrations taken as a whole and carefully inspected will enable the reader to grasp one aspect of the three-phase situation. One has only to compare this jungle of wires, poles, girders, brackets, and suspending devices with the overhead work on the electrified lines of the London and Brighton Railway to see how great is the advantage of the latter in the way of simplicity.

Steel Rails and Corrugation.

On February 24 two interesting papers, official abstracts of which are given in this issue, were read at the Institution of Civil Engineers. In the first paper Mr. W. M. Willox dealt with "Rail Steels for Electric Railways," and in the second, Mr. Stephen P. W. D'A. Sellon discussed "Rail Corrugation and Its Causes." Both these papers clearly demonstrate that electric railways and tramways are faced with serious problems of rail wear, though of somewhat different kinds. The papers amply prove that the ordinary quality of rail steel does not meet the requirements, and, at the same time, that "necessity is the mother

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of invention." On the Metropolitan Railway, Mr. Willox has found that the Sandberg silicon rail has to a great extent minimised rail trouble, and for points and crossings, and even special places, manganese steel more than repays its high original cost. Mr. Sellon, who deals more particularly with tramway rails and corrugation, suggests that as the problem of corrugation is not solved, the next best thing is to get a better rail, and urges that a committee be formed to draw up a rail specification which will obviate corrugation, or at any rate minimise it. We think, however, that tramway engineers should be given credit for having already realised this and evolved specifications which have produced tramway rails of longer life and with less tendency to corrugate than those previously adopted. We need only refer to several articles on this subject which have appeared from time to time in this journal, and to the interim corrugation report of the Municipal Tramways Association, which demonstrate that tramways have, to some extent, solved their trouble by the same method which has given good results on the Metropolitan Railway, viz., the use of silicon steel rails.

Parliament and Transit.

Is it possible to have any hope of practical results arising from announcements relating to the problems of transit, and increased grants for road maintenance, which the Chancellor of the Exchequer recently made in the House of Commons? This question naturally arises because of the comparative failure of whatever course Parliament has taken in regard to light railways, and of the complete absence of a scheme of transit from the work of the Development Commission. Under such circumstances it is time to ask politicians to desist from their verbal speculations, and to place the drafting and carrying out of their ideas in the hands of men who have spent their lives in dealing with matters appertaining to transit. A revelation regarding the failure of many schemes authorised under the Light Railways Act to come into existence was recently given by Mr. H. A. Stewart, one of the Light Railway Commissioners, in the evidence which he gave before the Royal Commission on Railways as to the work of the Light Railway Commission. Of a sum of one million pounds set aside by the Treasury at the passing of the Light Railways Act, 1896, three-quarters remain in hand. According to Mr. Stewart the money has remained unallotted because the return on capital expended by light railway companies has been small, and therefore the construction of additional lines had been discouraged. Mr. Stewart is of opinion that if such railways are to be laid down to any extent it will be necessary to do it with money which has public credit behind it, a course which will entail some form of public control, both as to construction and working. A year or so ago the Light Railways Association and the Municipal Tramways Association jointly obtained a sympathetic response from the then President of the Board of Trade to some recommendations advanced by them for the amendment of the Act. In view of Mr. Stewart's observations, and of an inquiry which the Board are making into the question of transit in relation to the housing problem in town and country, the time is appropriate for the two bodies to prepare a report dealing with Mr. Stewart's observations, especially as the Chancellor of the Exchequer on February 17 invited the railway companies and municipal authorities to afford assistance to the Board in their investigation. It is due, perhaps, to the absence of preliminary investigation that the Development Commission have in three years nothing to show in the form of a transit scheme aided by them. After rejecting several proposals for road motor services, the Commission appointed a motor expert to report on the question of light railways, and apparently the document will be pigeon-holed until their next annual report is issued.

Mr. Burns's Traffic Investigation.

Mr. Lloyd George was so eloquent four years ago as to what benefits in the way of transit might be conferred upon agricultural districts from the setting up of the Development Commission and the Road Board, that business men and engineers will hesitate to attach undue importance to the two latest announcements by the Chancellor of the Exchequer. That statesman's ill-fated observations in connection with traction matters began when he was President of the Board of Trade, in which capacity he attended the opening of the Charing Cross, Euston, and Hampstead Underground Railway in June,

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1907. On that occasion Sir Edgar Speyer expressed surprise that the recommendation of the Royal Commission on London traffic had not been carried into effect, and in reply to that observation Mr. Lloyd George announced that the Government were considering the question of a Traffic Board with a view, he hoped, to action, and probably, immediate action. Since then a Select Committee of the House of Commons on London Motor Traffic have also reported in favour of a Traffic Board, but the Government have made no move. In the debate on February 17 on the Address in reply to the King's Speech, the Chancellor insisted that the problems of housing and transit were largely one, and pointed to the beneficial effects in both directions arising from the network of tramways and light railways in Belgium. Perhaps some hope may be derived from the fact that an administrator of the calibre of the President of the Local Government Board is investigating the question of transit, in order that the Government and the House may be advised what steps are necessary in order to develop access to towns and egress from towns. Mr. Burns need not go far to obtain the fullest information in respect to the light railways of Belgium, which were fully reported upon by Sir H. A. Yorke before he retired from the chief inspectorship of the Board of Trade. Ratepayers and their representatives, who are responsible for the maintenance of the roads, had high expectations raised by the Chancellor two days later, when the Address was still under discussion. The right hon. gentleman waxed eloquent on the damage occasioned to roads by motor traffic, particularly by vans belonging to large stores which journeyed 50 miles into the country, taking away the retail business of the local trader, and causing his highway rate to be doubled. Even the railway companies came in for his sympathy on similar grounds. Finally, he announced that the report of the Departmental Committee on Local Taxation is to be presented in the course of a few weeks, when the Government will take steps for the relief of local taxation, the burden of which, he admitted, is arresting all municipal development. In putting forward their claims for grants, municipalities should not forget to include the damage inflicted upon their tramway tracks by heavy motor vehicles.

RAPID TRANSIT IN PHILADELPHIA.

Mr. A. Merritt Taylor, who was appointed by the Mayor of Philadelphia in May, 1912, as a Transit Commissioner to investigate the problems of improved transit facilities for Philadelphia and its suburbs by the use of subways or other approved methods, recently issued his report. The report, which was briefly referred to editorially in our issue of February 12, is in two volumes, the first containing the report proper, together with statistical information, and the second consisting of an elaborate series of maps showing local means of communication by railway and other methods in Philadelphia and in other large cities. Definite recommendations are submitted by Mr. Taylor, and plans are presented whereby such recommendations can, Mr. Taylor says, be carried out by the city without burden to the taxpayer, and with ultimate profit to the city treasury. All legislation necessary to enable the city to carry out the recommendations has been passed by the Legislature. Mr. Taylor emphasises the insufficiency of rapid transit facilities in Philadelphia, and sets forth the great disadvantages resulting therefrom. The future prospects of the city are largely dependent on the development of adequate transit facilities.

The new railways, elevated, underground, and on the surface, which are proposed by the report, are shown in the accompanying map, which also indicates the position of the existing elevated and underground railway, with its surface feeders. The report recommends that there should be constructed by the city a subway with branches, including a two-track subway loop, a four-track subway from Broad Street northwards, and then divided into two elevated lines, one going to the east and north and the other northwards, and a two-track subway from Broad Street southwards to League Island. It is also proposed that an elevated railway to Frankford be built by the Philadelphia Rapid Transit Company, and another elevated railway to Darby should be built by the same company. It is further proposed that the Broad Street subway and branches be equipped and operated by the Philadelphia Rapid Transit Company, and that the proposed elevated railways should be equipped and operated as well as constructed by that company, under such conditions as will ultimately vest in the city the ownership of the recommended elevated lines and the equipment. It is proposed also that the department of city transit should at once enter into negotiations with the company. Another proposal is that the construction of the Broad Street subway should be financed by the sale of city bonds. The financial results to the city from the plan of transit development recommended have been estimated in detail, and are shown in tables in the report. It appears from these tables that the estimated capital expenditure for construction to be incurred so far as the city is concerned is over £8,000,000. The estimated income from operation, after paying all expenses, and interest at 6 per cent. on the entire investment of the operating lessee company, and after allowing for renewal reserve, is put at sums ranging up to as high as nearly £500,000 in the year 1930. After paying interest and sinking fund on the city's investment, it is estimated that by the same year there will be a surplus of over £100,000. In the earlier years till 1923 a deficit is estimated, but this is largely compensated for by surpluses estimated until the year 1930.

A proposed constitutional amendment will, if adopted, permit the city to issue 50-year bonds instead of 30-year bonds, and this will reduce the necessary annual sinking fund accruals from 2½ per cent. to 1 per cent. If this change is carried out by the general election in 1915,

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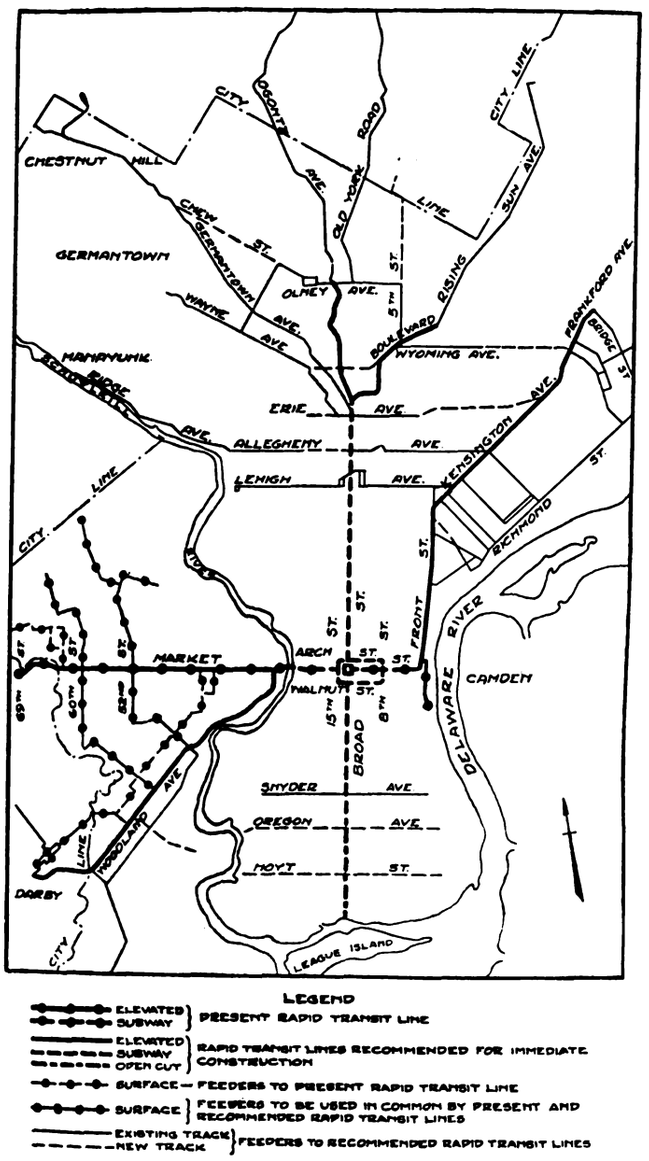
the surplus income would amount in 1930 to over £170,000, and any deficits of earlier years would be far more than wiped out. It is recommended that the city should take part in the transit development to the extent indicated because the Broad Street subway lines will not for some years yield a sufficient return to establish the necessary credit basis upon which a private enterprise would be able to raise the required capital on a reasonable basis, if at all.

The report proceeds to point to the necessity of providing sufficient surface lines (which correspond practically to tramways in this country) for the purpose of gathering and distributing traffic to and from the rapid transit lines. The present surface lines are



essential to the system, and it is expected that the Philadelphia Rapid Transit Company will enter into negotiations with a view to extensions being carried out. If negotiations with the Rapid Transit Company do not produce such results as the city councils can accept, the establishment by the city of an independent rapid transit system will be necessary, and will be made the subject of a supplemental report. In concluding his recommendations Mr. Taylor says that the city should regard this present action as a step towards an ultimate complete rapid transit system, and that in future development due consideration should be given to further lines which he has projected.

TRAMWAY REPAIR WAGON EQUIPPED WITH EDISON ACCUMULATORS.

A tramway repair wagon embodying interesting features has recently been supplied to the tramways department of the Ilford Urban District Council, to the specification of Mr. L. E. Harvey, A.M.I.E.E., the manager and engineer. The wagon is driven by means of an Edison storage battery, and as this is the first instance in England of the application of this battery to such a purpose we give a detailed description of the vehicle.

The wheel base of the chassis is 7 ft., and the track gauge 4 ft. 10 in., the overall length being 11 ft. The wheels are of artillery type with solid tires, the back pair of wheels having twin tires. The axles are solid drop forgings of nickel steel. All the springs of the chassis are fitted with grease cups to ensure easy riding. The motor is series wound, completely enclosed, and fitted with ball bearings, its normal current being 30 amperes at 70 volts, its speed being 1,300 revolutions per minute, and it has large overload capacity without overheating.

The motor drive to the countershaft is by means of a silent chain, and from the countershaft to the rear hub by a Reynold's roller chain. There are two brakes on the countershaft and two on the rear hubs, which are operated by foot pedals on either side of the steering pillar, the brakes being of the internal expansion type. The speed of the vehicle is 10 to 12 miles per hour with the battery fully charged, going down to about 8 miles per hour when the battery is approaching its discharge limit.

The battery is the Edison A6 type of 225 ampere-hours capacity, having 64 cells, with an average discharge voltage of 75, the normal charge for the battery being about 40 amperes at 110 volts, but if necessary a heavy boosting charge of short duration can be given at any time. The battery is now so well-known that it is not necessary to enter into a description of it here. The vehicle is equipped with a Sangamo ampere-hour meter which shows the amount of charge of the battery, and is an indication to the driver as to how much energy he has left in the battery when on the road.

The telescopic tower is solidly constructed of pitch pine and birch, and it has metal slides to ensure easy working between the two portions of the telescope, and to make them a good fit and prevent slogger. A revolving platform is fitted to the top, and is of ample dimensions for three workmen, and they can work upon the platform when it is extended at right angles to the length of the car. It was found, however, that when the platform was in this position, with the tower fully extended, the original semi-elliptical springs on the rear axle of the chassis were too flexible, and these were, therefore, reinforced by a strong spiral spring between the outer ends of the axle and the under part of the chassis frame.

Two head lights and one rear light are fitted, working from the battery, and a throw-over switch is provided, so that when the battery is approaching its discharge limit and the voltage is low, five more cells are thrown into circuit so as to maintain a good light when the vehicle is moving. The wagon is provided with two groups of three 12-volt lamps on the top platform, these being supplied from the cells by means of a twin cab-tire-sheathed cable running up the centre of the tower, arranged similarly to a lift wire, and this wire is connected to the revolving platform on the top by means of two circles with copper brushes bearing upon them.

The groups of lamps are equipped with clips to fasten

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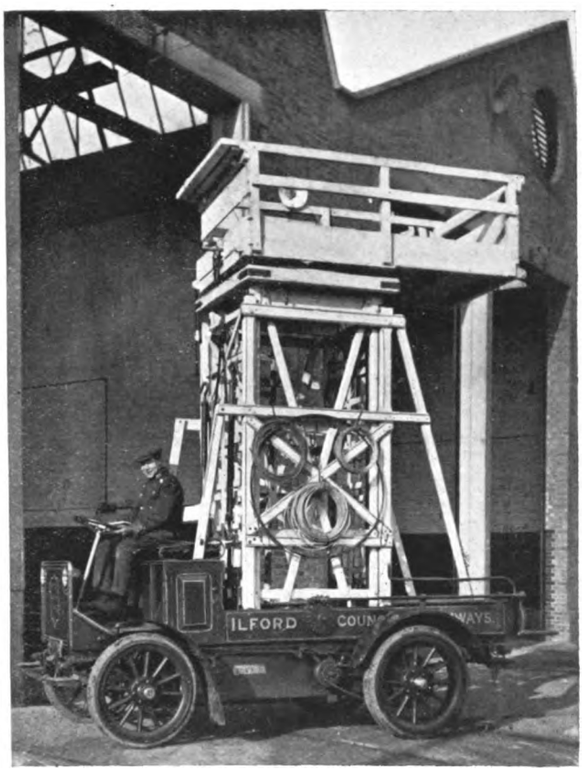
them on to the rail of the platform so as to be in any position to throw light upon the work in hand, and they are connected by means of cab-tire-sheathed twin wire, with plugs and sockets on the end of the revolving platform. These lights are also worked by two-way switches which, when the battery is nearly discharged, can put two extra cells in circuit so as to maintain an efficient light.

The vehicle has no bonnet in front, but merely a dash plate, and this is found to be of great advantage in practice, as when the revolving platform is turned round to the front, the vehicle can be run close up to a tramway pole, and in this position the men can reach their work instead of very often having to back the wagon down to a pole, which is sometimes a very awkward operation.

The controller is very substantial and workmanlike, and is equipped with five notches which are actuated from the driving lever, the spindle of which is concentric with the steering pillar, there being



Edison Accumulator Car.

Showing the Tower Raised.

five forward speeds and five backward speeds, the latter being effected by the driving lever after having raised a small lever on the inner end of it.

The first speed is obtained by putting the cells in series with the armature and field coils of the motor, which is, of course, a series one, and with the whole of the resistances. The second speed is obtained by cutting out a part of the resistance. The third speed is obtained by cutting out the whole of the resistance. The fourth speed is obtained by putting two pairs of field coils in parallel and in series with the armature, and the fifth speed is obtained by putting a shunt across the two pairs of field coils which are in parallel, and thus weakening the field.

The wagon is capable of reaching any part of the tramway system from the tramway depot in about 15 minutes, and can be used either for emergency work or for inspection work, the first notch giving so slow a speed that workmen can remain on the top inspecting the trolley wire whilst the vehicle is slowly proceeding along the road. The weight of the wagon complete, but with no tools upon it, is 2 tons 6 cwts., and equipped with tools, spare gear, etc., it weighs about $2\frac{3}{4}$ tons.

Upon a test run through traffic on January 22, 8·2 miles were covered in 45 minutes with a consumption of 42 ampere hours. This gives an average speed of 11 miles per hour with a current consumption of about a third of a unit per mile. In practice, however, this extremely low current consumption is not maintained, as from the nature of tower wagon work there is a considerable amount of shunting and moving about, and as a matter of fact the average consumption under working conditions is about ·7 unit per car-mile.

The car depot being adjacent to the electricity works, there is every facility for charging the vehicle; it is the custom when a charge is required to run the wagon in the last thing at night, and it is then fully charged by the time the cars go out in the morning, so that it is ready for emergency work during car working hours.

The wagon takes the place of a horse wagon which cost the department at least £3 per week, as a hired horse and man always had to be in attendance ready for emergencies, and of course it gets to breakdowns in very much less time than a horse wagon. No special chauffeur is kept for the vehicle, but the linesman or his mate drives it, and so simple is the operation of it that the men were trained to the work in two or three days.

There are very few working parts to get out of order, and such as there are being mostly of an electrical nature, and such as ordinary tramway repair men are used to, faults can easily be remedied by the depot staff. The battery itself is fully guaranteed by the Edison Company for five years, the guarantee stating that if the battery is not in as good or a better condition at the end of this period, then it will be replaced free of charge. The battery is fairly easy to get at, and the only attention it requires is to have a small quantity of distilled water added to the cells before every second or third charge, and this operation is quickly carried out by means of a patent filler which rings a bell when the electrolyte has reached the proper level.

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SOME RAILWAY CONDITIONS GOVERNING ELECTRIFICATION.*

By Roger T. Smith.

It is convenient to divide railway services into three groups, urban and suburban passenger services, fast passenger services, and fast or slow goods and mineral service.

Urban and Suburban Passenger Service.

If a railway possessing a suburban system equipped for a certain time-table finds this equipment outgrown by the traffic, it is obvious that it must increase the number of coaches run in a given time. One solution of this problem is electrification. With electrification a maximum of 48 trains an hour can, if required, be run each way, while employing existing stations and tracks. With tracks and stations (and hence also the train length) remaining as before, the number of passengers carried per hour has in many cases been doubled by increasing the schedule speed 50 per cent., while improved signalling has at the same time made it possible to increase by 50 per cent. the maximum number of trains per hour. The essential element which gives to electric traction its advantage over steam under these conditions is the motor-coach train. With the motor-coach train it is quite easy to have such an adhesive weight as will permit of a tractive effort, over and above that required to haul the train against resistances, sufficient to accelerate it during the notching period at rates up to 1½ miles per hour per second (2·2 ft. per second per second), while the rate of deceleration is usually increased up to two miles per hour per second. Passing from the engineering to the economic side, the question of the electrification of a suburban system has become for a railway company purely one of finance. Essentially it resolves itself into a question as to whether the fares charged for the service, even with the additional traffic obtained, can give a reasonable return, or any return at all, upon the new and old capital, after the cost of working has been provided for. It is not that suburban electric traction costs an unreasonable amount, but that circumstances make the revenue from such services unremunerative. Suburban fares have been falling steadily, and at the present moment it is safe to say that everybody in London and its suburbs is being carried at too low a fare to give proper remuneration to any form of traction which, in addition to rates and taxes and Government duty on some fares, pays for its road and the right to use it.

Like most other industrial working costs, that of running a suburban service depends on certain standing charges which, taken as a whole, hardly vary with the service given (upkeep of permanent way equipment, management, rent, rates and taxes, and station traffic expenses), and a charge varying with the service catered for (rolling stock, repairs and wages, running wages, and electricity). In a particular case the ratio of standing to variable charges for running a small suburban service for a year was as follows: Standing charges 60 per cent., variable charges 40 per cent., and of this 40 per cent. electricity formed three-fourths. This is a particular case where the cost of electricity was high, and as a rule its percentage effect is not so great. What is wanted to make urban traffic on electrical lines pay is either an increase in the fares, which is achieved abroad by zone fares, or the ability to purchase electrical energy delivered to the conductors at, say, ¼d. per kilowatt-hour. Competition may prevent the former. Is there any chance of obtaining cheaper electricity? In many cases it has not in the past been possible for railways electrifying suburban services to buy electricity from outside, but wherever they have been able to do so the saving of the initial cost on which capital charges have to be met and the saving to the railway of the management of a business organisation that is very different from its other organisations is a great gain. In considering financial results likely to follow suburban electrification, competitive fares are so low that the process is generally discouraging, except where a new traffic can be created in districts from 10 to 30 miles from the terminus. The raising of fresh capital for anything that is not certain to swell the dividend is a very serious matter at present when the credit of British railways stands so low.

Fast Passenger Service.

When the question of main line passenger services is considered from the point of view of electric traction, the problem alters completely. As compared with the electric locomotive the steam locomotive is handicapped by the distribution of weight due to the length of the boiler. In the former, from the shape and size of the motors, it is possible to get a greater ratio of adhesive to total weight than in the latter, especially if every axle is driven. In general for fast passenger service the acceleration of the steam locomotive is limited, not only by the boiler capacity, but by the maximum adhesive weight on the coupled driving wheels.

A 4-6-0 type passenger locomotive can haul a train of 450 tons on the level at the highest speeds called for in this country, and, unassisted, a train of 300 tons up a gradient of 1 in 50. To haul such a train a constant output locomotive is satisfactory, and the control of the output and speed by the regulator and the cut-off is so complete that the steam locomotive can run at any speed below its upper limit for the load hauled. To get the adhesion necessary when starting is possible with appreciably lower axle loads with the electric than with the steam locomotive, while for the same tractive effort the advantage in total weight is always in favour of the electric locomotive. Since the series motor can be loaded momentarily 75 per cent. above its hourly rated capacity, and as every axle can be made a driving axle, very great starting torques are possible, but on British railways they would be not only useless but actually harmful, as they would exceed the draw-gear strength. Unlike the case of the multiple-unit train, the adhesive weight may be only 12 or 14 per cent. of the total train weight, and the strength of the draw-gear limits the draw-bar pull after starting to 12 tons. But with an increase in speed the torque of the series motor falls off so rapidly that above 60 miles per hour (where difficulties begin with steam locomotive design) no electric locomotive yet built for hauling only such maximum loads as obtain on our railways could give anything like 1,100 H.P. at 70 miles per hour, as given by the 4-6-0 steam locomotive.

Turning from the engineering to the economic side, and assuming a suitable electric locomotive has been built, a very rough estimate may be made of the cost of working. The annual cost of a steam passenger locomotive, averaged over all the different types in use on a railway carrying passengers, goods, and minerals over not less than 2,000 miles of route, may be taken to be £825 for such items as do not vary with the mileage run. The annual cost of coal at about 9s. per ton per 10,000 B.TH.U., averaged over the whole working, together with the cost of water, may be taken to be £350, giving a total for the year of £1,175, inclusive of capital charges. This is a mean for all locomotive types working an average passenger mileage of 10,000,000 train miles per 1,000 miles of route. During the year a passenger engine may be expected to run, say, 27,000 passenger train-miles, so that the mean cost for locomotive expenses (including locomotive capital charges) per train-mile will be 10½d.

Of the above sum of 10½d. per train-mile, 3d. per train-mile will represent the cost of coal and water. Cheap coal in this country is one of the factors making against railway electrification. The cost of coal burnt in a large modern generating station producing electricity for hauling trains by an electric locomotive is less than half the cost of coal for doing the same work in a steam locomotive.

Weight for weight the electric locomotive costs about twice as much as the steam locomotive, but for the same adhesive weight the electric locomotive weighs some 30 to 40 per cent. less than the steam locomotive. Electric repairs and renewals cost less, and the net result is that the annual cost of the electric locomotive will be in the neighbourhood of £1,250 per annum, assuming the same rate for capital charges. But while the passenger steam locomotive only runs on the average 27,000 train-miles in the year, spending 75 per cent. of the time out of active service, the electric locomotive, which need only be in the shops for one month out of the 12, will not spend more then 50 per cent. of its time out of active service. The electric locomotive can run at least 40,000 passenger train-miles per annum. Multiple-unit motor cars run 45,000 to 50,000 miles per annum.

If these figures are accepted, the cost per train-mile with the electric locomotive (including locomotive capital charges) will be 7½d., always assuming that electrical energy can be bought at ¼d. per kilowatt-hour.

Assuming that a saving of 3d. per train-mile was secured by electrification, there would be a possible annual saving due to electrical working of £125,000. If capital charges (interest and amortisation) were 6 per cent., this would represent the charges on a capital of £2,100,000 per 1,000 miles of route, or £2,100 per mile of route. This sum would certainly not cover the corresponding electrical equipment of the line on an overhead system. The only items for which a reduction in costs may be expected are the cost of electricity and the capital cost of electric locomotives. No great reduction in the cost of the former can be expected so long as railways generate their own electrical energy. If electrical energy could be bought at ¼d. per kilowatt-hour, and the electric locomotive could be made for £50 per ton, the cost per train-mile in the above estimate would be reduced to about 6d. The problems in front of the electrical engineer who would compete with the passenger steam locomotive are, therefore, first, to design an electric locomotive that will do what the steam locomotive does at high speeds; secondly, to reduce the cost of the electric locomotive (which will come about when there is sufficient demand for it); and thirdly, to be in a position to buy electrical energy at something approaching the ¼d. per kilowatt-hour which forms Dr. Ferranti's ideal.

Fast or Slow Goods and Mineral Service.

For goods and mineral service the outlook is different, and here each individual case must be worked out on its merits. It may, however, be said that if the same analysis be followed out in the case of the average cost of an electric locomotive for goods working as has been done for passenger working, the same comparative ratio of cost between coal and electricity per train-mile would hold with electricity at ¼d. per kilowatt-hour, in place of the ½d. per kilowatt-hour assumed for passenger service. Considering English conditions, the chief

* Abstract of a paper read before the Institution of Electrical Engineers, February 12, 1914.

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difference between goods service and passenger service is the reduction in the annual train-mileage run by the steam locomotive. Whereas for steam passenger service it was taken to average 27,000, for goods and mineral service it drops to 10,000 train-miles per locomotive. In addition to this the coal per train-mile is nearly doubled. On the average some two-thirds of the available steam locomotives may be expected to be in steam on any one day, and of those engines in steam the engine mileage will probably exceed the passenger train-mileage by little more than 5 per cent. On the other hand, goods engine-mileage may exceed goods train-mileage by more than 30 per cent. Each goods engine in steam may not work more than 40 to 50 train-miles per day averaged throughout the year, which gives some idea of the length of time the locomotive is standing in steam and using coal but earning nothing, while nearly one-third of the engines are away under repairs. It is in this direction that the electric locomotive appears to have its best chance. In America the strength of the draw-gear is such that draw-bar pulls of more than 30 tons are permissible. In British goods and mineral service the limiting factor is the strength of the draw-gear, which is tested to 50 tons and with a factor of safety of four is supposed to be worked at a maximum load of 12 tons. While the wagons owned by railways can have their draw-gear maintained against inevitable degradation by fatigue and wear, the privately owned wagon is not in the same position. Unless the whole method of working goods traffic in this country is to be altered, a locomotive is not required to give a draw-bar pull of more than 12 to 14 tons after starting.

For goods working involving the equipment of sidings some form of overhead equipment seems imperative. Continuous current, single-phase with commutator motors, single-phase with spilt-phase motors, and single-phase with mercury arc rectifiers and continuous-current motors, and three-phase with induction or cascade motors, are all possibilities, and each has to be considered on its merits. Owing to the special conditions of goods and mineral traffic in this country, the electrification of goods and mineral lines is likely to begin only in favourable districts, especially with steep gradients where the overload capacity of the electric motor and its accelerating ability will enable traffic which is now very slow to be speeded up. This will increase the earning capacity of the existing permanent way without costly re-grading. To sum up the position as it appears to the author, the inherent advantages of the electric locomotive for goods and mineral haulage are, first, its ability to haul up to the maximum strength of the draw-gear at more than double the speed possible with the most powerful steam locomotive which can be built within British load gauges; secondly, the ability, if necessary, to have all axles driven so that the whole weight of the locomotive is available for adhesion while the weight per axle is sensibly reduced; thirdly, the advantage that any driver can work any locomotive, which is not the practice in this country with steam locomotives; fourthly, the ability to run annually at least twice as many train-miles as the steam locomotive, partly due to increased speed and partly due to less time spent in the repair shops and for cleaning; fifthly, the saving of all coal wasted by the steam locomotive when getting up steam, standing in steam, and left in the firebox at the journey's end, with the result that with electrical energy at ½d. per kilowatt-hour the bill for current per mile is about the same as the bill for coal and water per mile; sixthly, the possibility when the strength of the draw-gear permits of loads being hauled quite beyond the capacity of any steam locomotive that can be built within our load gauges.

RAIL-STEELS FOR ELECTRIC RAILWAYS.*

By William Willox, M.A., M.Inst.C.E.

The reduction of the life of rails in tunnels from an average of five years to an average of less than three years, and in certain places to less than one year, on the electrified portion of the Metropolitan Railway, induced the author to make tests of various kinds of steel rails in the curve between Farringdon Street and Aldersgate. The object of the paper was to describe the results of these tests, and also the results of tests for wear of various steels, including manganese steel, in points and crossings.

The traffic over the curve mentioned is exceedingly heavy, and in the morning and evening there are 42 booked trains per hour on one line.

Chemical analyses, tensile tests, tup tests, and impression tests have been made of all the rails used, and sections of the rails have been etched. Taking into consideration these tests, the fact that railways must keep the cost of their permanent way within reasonable limits, and that the cost of re-railing is very high, where only two and a half to three hours are available for this work, namely, between midnight and early morning, the author has come to the conclusion that open-hearth basic high silicon rails, manufactured by the late Mr. C. P. Sandberg's process, and under careful supervision, has proved the most economical.

The number of broken rails for the last six years has been very small; the history of one of these broken rails was given in the paper, the wear after five years in the tunnel being only ⅛ lb. per yard. The result of the use of manganese steel rails in the curve referred to is also given, and may be interesting, as rolled manganese steel rails, so far as the author knows, have been little used in England, even in crossings.

RAIL CORRUGATION AND ITS CAUSES.*

By Stephen Prescott White D'Alte Sellon, M.Inst.C.E.

The corrugation of rails has become general and serious upon railways and tramways since the introduction of electric traction, and seriously exercises the owners of such undertakings. Investigations organised by many associations in various parts of the world have not discovered a solution of the trouble, or propounded any theory of the causes which has found general acceptance; nor have they put forward any remedy. The object of this paper was to put forward the present position for discussion, in the hope that therefrom assistance towards a remedy may proceed. Large expenditure is being incurred by tramway undertakings in grinding out corrugations, thereby shortening the life of the rails abnormally. It is estimated that the general manager of the City of Glasgow Tramways that his undertaking spends not less than £10,000 per annum in this grinding operation.

The author is of opinion that the rail-steel now used for rails is not hard enough or tough enough for its work. Possibly modern methods of steel and rail making are at fault in this direction. The use of wheels of small diameter is evidently severe on the rails, but the conditions of tramway working make alteration impracticable. It therefore becomes necessary to find a material which will not yield to the wheel actions which are the immediate cause of corrugation.

The author believes that hard rails—*i.e.*, with a high proportion of carbon—are essential, and gives some evidence from his own and others' experience that such high-carbon rails resist the corrugating actions of the wheels, as well as ordinary wear.

The British standard specifications were established before corrugation was realised as a serious possibility, and the range of carbon content permitted, besides being rather wide, only approaches the hard side for Bessemer steel, whilst it is on the soft side for open-hearth steel. The general character of corrugation is described, stress being laid upon the facts that the "crests" have the appearance of planished or cold rolled steel, and are relatively hard and refractory to acid; and that the "hollows" are dull, show some lateral detrusion and pitting, and are only slightly harder than the body of the steel. The conclusion drawn is that the "crests" are cold rolled, and the "hollows" are surface which has been crushed, due to the vertical loads imposed by the wheels oscillating about the elastic compressive limit of the steel. How the oscillatory character of the load is brought about is not considered, but it is pointed out that at ordinary speeds the usual pitch of the corrugations on tramway rails corresponds with a frequency of the order of 100 per second. The difference between this periodicity and that causing the corrugation of macadam roads by motor vehicles is referred to. The possibility of the rails receiving initial corrugations in the processes of rolling and cooling is briefly discussed, but it is pointed out that such initial corrugation, if it ever exists, is uncommon. Differences of surface hardness or internal stresses received during manufacture are suggested as possibilities.

Leaving these suggestions, the fact remains that corrugation is due to the failure of the rail-table under the stresses imposed upon it. The surface is alternately cold rolled and disintegrated. The measurements of static pressure made by Mr. Worby Beaumont, and set out in the paper he presented to the British Association in 1911, are shown to prove that pressures of such magnitude as to produce destructive effects occur, but that it is probable that the compressive elastic limit of rail-steel is not generally exceeded.

The evidence, therefore, seems to show that a comparatively small increase in the compressive strength of the steel will prevent the particular kind of wear under consideration.

The author suggests that the essential points to be specified are mechanical properties corresponding with the working stresses imposed upon the rails, and first compressive strength. The British standard specification prescribes an ultimate tensile strength of 40 tons per sq. in., the compressive strength is probably about the same as the tensile; the actual wear of tramway rails suggests that it is somewhat in excess of 40 tons per sq. in. Probably steel with an ultimate tensile strength of 50 to 60 tons per sq. in. will be hard enough to resist the destructive stresses, but it is essential that it shall not have a high degree of ductility. The minimum pressure needed to produce surface crushing and flowing should be determined. It is suggested that a Brinell test may give all the information needed. The tup test may have to be modified, but rails laid on a continuous concrete substructure have a large margin of safety against breakage from vertical shocks, and a less severe tup test should suffice. The whole specification of the rail in respect to its mechanical qualities should bear a direct relation to the stresses which it will be called upon to resist.

* Official abstracts of papers read before the Institution of Civil Engineers on February 24. Interesting discussions on these papers occupied three evenings, but no report thereof may be published until the issue of the "Proceeding" of the Institution, which may be expected within the next twelve months.

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TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION.

Annual Meeting and Dinner.

The annual dinner of the Tramway and Light Railway Association was held at the Trocadero Restaurant, London, on March 6, under the presidency of the Right Hon. Viscount Chilston. There was a very large attendance, including:

R. L. Acland	M. A. Edwards	R. Johnson	F. Schofield
A. Aigeltinger	E. H. Edwardes	J. J. Kelly	H. Scholey
J. G. Ames	S. G. Elliott	F. W. Ketley	C. S. Schultz
R. H. Aspinall	— Engholm	A. S. King	— Scownie
S. E. Baker	H. England	C. W. Knight	S. Sellon
G. Balfour	H. J. Ferguson	A. T. Lambert	E. E. Sharp
A. L. Barber	H. Fleming	E. R. Lascelles	A. C. Shaw
C. Barber	F. W. Foston	E. C. Laughton	A. H. Shaw
E. P. Barfield	W. E. Freir	Ald H. Linsley	Ald. S. Shaw
E. S. Barralet	B. Fry	W. S. Lonsdale	C. W. Shepherd, J.P.
B. G. Battson	E. Garcke.	W. L. Lorkin	R. T. Simcock
W. W. Beaumont	S. E. Garcke	H. Lotery	C. C. Skeats
A. H. Beatty	M. R. Gardiner	W. McBean	A. Skinner
A. R. Beken	J. H. Garratt	S. McCay	H. Melville Smith
L. C. F. Bellamy	T. E. Gatehouse	J. B. McKinnon	J. A. J. Smith
E. Benedict	G. Gerrish	J. McLeod	W. Alderson Smith
H. H. Berry	O. T. Gibb	Coun. J. A. Macdonald	R. L. Smitham
P. J. Beucher	Sir A. Gibbons	C. W. Mallins	Ald. R. A. Smithson
C. E. S. Bill	T. B. Goodyer	J. H. Manners	H. K. Spark
W. F. Bishop	W. A. Green	H. P. Maro	C. J. Spencer
H. E. Blain	W. L. Green	W. F. Marwood	A. H. Stanley
F. Bland	R. R. Greene	A. V. Mason	Hon. A. Stanley, M.P.
E. Bond	J. Greenwood	H. F. Maynard	C. D. Stanley
F. Bourne	J. Greenwood, Jr.	Coun. R. Mayne	W. A. Stevens
E. Boys	C. H. Gregory	H. G. Merrick	W. J. Stevens
S. Boys	G. G. Gribble	A. G. Mickleburgh	J. E. Stewart
H. Broadbent	R. C. Griesbach	J. S. D. Moffatt	H. P. Stokes
Ald. H. Brown	W. Hallatt	— Morgan	R. Stutz
P. B. Brown	J. B. Hamilton	J. F. Moss	A. W. Taite
N. D. R. Bruce	W. E. Hammond	E. M. Munro	A. W. J. Talbot
B. S. Bullivant	C. Harding	E. T. R. Murray	C. G. Tegetmeier
F. Burfoot	W. G. Hardy	W. Murray	W. Thom
C. T. Burnet	H. G. Harrington	E. A. Nash	P. H. Thomas
S. H. Callow	H. B. Harris	A. Norton	W. Thomson
J. Cameron	L. E. Harvey	C. S. Partridge	J. P. Tippetts
J. Cater	J. L. Hawksworth	F. Paterson	A. Toms
A. W. Chambers	H. Hawley	A. F. Paul	J. W. Towle
F. J. Chapple	W. H. Hawley	H. H. Perry	H. E. Townell
J. T. Chapple	Lord Headley	F. Pick	R. S. Tresilian
Viscount Chilston	G. Heckman	Dr. E. H. Pickin	H. J. Troughton
A. W. A. Chivers	A. G. Hedgcock	L. E. Pickin	P. S. Turner
A. Clare	Col. Hellard	W. B. Pickering	W. H. Turner
F. Coates	J. Hemmings	G. J. Polglase	A. F. Valentine
H. Cockburn	J. M. Henderson, M.P.	A. H. Pott	C. E. Waite
C. F. Colton	F. Hewer	D. W. Ratliff	W. W. Wakeley
P. Compton	A. B. Hewitt	— Rankin	— Walker
H. P. Conibear	C. W. Hill	H. T. Rice	A. H. Walton
C. Corner	C. Shirreff Hilton	W. B. Richardson	F. A. Warlow
F. Coutts	A. R. Hoare	G. A. Roberts	F. Warner
A. Coveney	A. J. Hollington	G. A. Roberts	V. Watlington
G. F. Craven	W. Hopkins	H. W. Roberts	J. W. Waugh
F. Crookes-Harris	H. M. Howard	Ald. J. F. Rodgers	A. E. Wells
F. Crosby-Jones	R. J. Howley	W. Royce	H. R. White
C. H. Dade	H. G. Hughes	A. Rozier	A. G. Whyte
E. E. Daglish	P. M. Hunt	W. Rumball	H. T. Wigham
Colonel d'Alton	J. G. Hunter	W. Rutherford	A. M. Willcox
A. de Turckheim	W. J. Iden	— Sandberg	H. L. Williams
J. Devonshire	W. E. Ireland	F. E. Saunders	W. M. Wright
Colonel von Donop	S. F. James	— Saward	C. Wray
S. Dudman	W. E. Jewell	W. Sayer	W. Wyld
G. T. C. Edwards	A. Johnson	H. M. Sayers	

Following the usual loyal toasts,

Mr. Harry England (vice-chairman) proposed "Our Guests." After offering a hearty welcome to the new president, Lord Chilston, Mr. England said that the guests present were representatives of the permanent officials of the Board of Trade, representatives of the Municipal Tramways Association, and many friends from Blackpool, where the Association had been entertained so hospitably at its last annual Congress. Although the decisions of the Board of Trade were not always to their liking, they had the satisfaction of knowing that during the last two or three years the Board had recognised that the Municipal Tramways Association and the Tramways and Light Railways Association were powers in the land, and had consulted them in regard to regulations which they proposed to make. They greatly appreciated that recognition, and hoped it would continue, so that before making any regulations with regard to tramways the permanent officials would consult with them as practical men. With regard to the Municipal Tramways Association, he was sure they were all pleased that the strained feeling which existed between that body and their own Association some years ago had entirely disappeared, and they were working amicably together.

Alderman H. Linsley (president of the Municipal Tramways Association), in responding, said he agreed with Mr. England that it was very desirable that the two Associations should be good friends, as they were at present, for they could help one another to mutual advantage. He regarded the presence of representatives from the Board of Trade as an act of real diplomacy on the part of the Council, for surely if there was anyone with whom they should be on good terms, it was with the officials of that Department. He must say he had always received the greatest kindness and consideration from the Board of Trade. As president of the Municipal Tramways Association, he hoped that in the coming year he would have the pleasure of the company of many representatives of the Tramways and Light Railways Association at Salford at their Conference in September next.

Alderman J. H. Rodgers (chairman, Newcastle Tramways Committee) also responded. He remarked that he had heard it whispered that the Association was going to Newcastle for its conference this year. As chairman of the Tramways Committee of the city, he could promise them a right hearty Northumberland welcome.

Mr. J. M. Henderson, M.P., in proposing the toast of "The Tramways and Light Railways Association," said that the Association was born in 1897, and therefore it had not yet arrived at the years of discretion. It was formed for the purpose of co-operating together all those interested in tramways, either municipal or otherwise, for mutual assistance. Tramways in this country represented an enormous interest. There were 286 tramways either owned by companies or municipalities, and the capital involved in those enterprises amounted to the enormous sum of 80 millions, and the gross annual receipts reached 15 millions. There were 2,626 miles of tramway laid, and they were being added to every day. There was no enterprise in the kingdom that he knew of that more required protection—not in the political sense—than tramways. From the very moment that a tramway enterprise was conceived, it met with tribulation at every point from local bodies, and often from Parliament. He believed, however, that a better feeling was getting abroad, thanks to the work of the Association, and the public were beginning to realise that it was not in their interests to put obstacles in the way of tramway enterprise, but that it paid them to assist them in every way.

The Chairman, in replying to the toast, after thanking the members for having elected him to the office of president, said that the Association, which had now existed for 17 years, was formed to watch over the interests of the tramway world, whether the tramways were owned by municipalities or by companies. He did not agree with Mr. Henderson that tramways were unpopular. He thought they filled a very necessary and useful purpose in enabling overcrowded populations to live outside the zone of their work. The housing problem was exercising the minds of the country at the present time, and he thought that tramways might do much towards affording a solution of the problem. As to the Association, he was pleased to know that it was in a most flourishing condition financially, and last year, for the first time in its existence, its income from subscriptions was over £800, and most satisfactory of all it was absolutely clear of debt. He had to thank their hosts at Blackpool for the splendid manner in which they received the Association last year. This year, as they had heard from Alderman Rodgers, the Conference was to be held at Newcastle, and he was quite certain that their friends in the north would give them a most hearty and cordial welcome. The real work of the Association last year was the test case which they took to the House of Lords on the rating question. That decision had naturally been a great disappointment to all of them, whether they represented municipal or company tramways. They must accept the decision, and they could only look forward that at some later date they might find some compensation for the serious set back which the decision carried with it. The case had, however, not been without its compensations, for it had shown what a splendid spirit of unanimity and loyalty existed between the two branches of the Association, as evidenced in the response which was made to the appeal of the Council for financial assistance. The question of the maintenance of the roads, especially with regard to the damage done to them by other users, was a matter that came prominently to the minds of those who were versed in the conditions under which tramways were managed and worked. In that respect he thought tramways undertakings had legitimate and serious grievances. He was quite certain that none of them would wish to claim a monopoly of the roads, but they did think that under present conditions they were unduly and unjustly handicapped, and that they bore a greater portion of the expense than was their fair share. During the whole of his 22 years of Parliamentary life he knew of no question that had had more thought given to it than that of the unequal incidence of local taxation, and he thought it ought to be possible for the two political parties to come together to find some adjustment on fairer lines. As representing tramways they thought that the maintenance of the roads ought to be paid for more by the motor 'bus and other heavy traffic which used the roads and abused their tracks and setts. As an Association they had recently had a good deal to do with two great departments of the State. They had a warm corner in their hearts for the Board of Trade, which had always met them in the friendliest manner, although they might not have been able at all times to see eye to eye with them in the proposals they had brought forward. At the present moment there were committees of the Association sitting with the object of assisting the Department and placing before them their views on certain technical matters. He wished to take that opportunity of thanking the Postmaster-General for the fair way in which he had met the Association in regard to the question of guard wires, and he trusted that their relations with all the Government departments might continue to be of the friendliest character, as in

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that way they were more likely to get their requests granted than by "kicking against the pricks."

The Hon. ARTHUR STANLEY, in giving the health of the Chairman, said they were very pleased to welcome Lord Chilston as their president, and they trusted he would long be with them to guide the Association in its work. He was very glad to hear the remarks of Alderman Linsley as to the good feelings that existed between the Municipal Tramways Association and their institution, and he could promise the Alderman that a good many of them would go to Salford to take part in the meeting of the Association there. They owed Alderman Rodgers their warm thanks for the hearty invitation he had given the Association to meet in Newcastle this year, and he hoped the Alderman would tell his committee that it was not the quantity of hospitality that they received that they attached so much value, as the quality. With regard to their president, in Lord Chilston they welcomed one who took not only a theoretical interest in their industry, but a real practical interest.

The toast was received with great enthusiasm, and briefly acknowledged by the Chairman.

THE ANNUAL MEET.

The annual meeting was held before the dinner. Mr. A. de Turckheim, the secretary, read the notice convening the meeting.

The Hon. ARTHUR STANLEY, M.P. (chairman of the Association), in moving the adoption of the report, said that the revenue from subscriptions for the year amounted to £805, as against £734 in the previous 12 months. That total represented an increase of more than 50 per cent. over 1907, which was the first year of the reorganisation of the Association. The expenditure had amounted to £657, against £640. The net result of the year's working was a surplus of receipts over expenditure of £148, against £86 the previous year. Referring to the expenditure on the rating appeal, the chairman said it was very unfortunate that the case had gone against them, and the decision was a great disappointment. They owed a debt of thanks to those members who assisted financially in fighting the case, and to counsel who fought it for them. The Association had continued to do steady and useful work during the year. The settlement arrived at with the Postmaster-General in regard to guard wires was a very fair one. The settlement which was come to in 1909 with the Somerset House authorities in respect to assessment for income tax, which was to have been revised at the end of five years, was now to continue until the period relating to the accounts of 1917-18. Two special committees of the Association were now sitting in connection with questions referred to them by the Board of Trade, and it was expected that they would report to the Council before long.

Mr. H. ENGLAND seconded the motion, and the report was adopted.

The following members were then elected to the Council:

Mr. Fred Bland, of Messrs. Edgar Allen and Company, Sheffield.

Mr. C. W. Mallins, general manager, Liverpool Corporation Tramways.

Mr. R. R. Greene, general manager, Wallasey Corporation Tramways.

Mr. A. V. Mason, general manager, South Metropolitan Electric Tramways and Lighting Company.

Mr. R. S. Tresilian, secretary, Dublin United Tramways Company.

Mr. R. J. Howley, joint manager, British Electrical Federation.

A cordial vote of thanks to the chairman for presiding terminated the proceedings.

A RECORD YEAR AT LIVERPOOL.

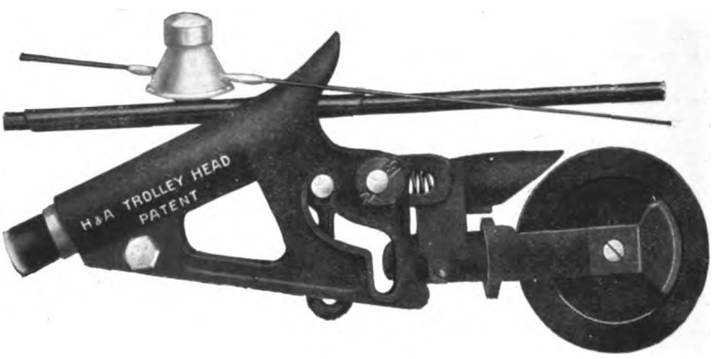
The report of Mr. C. W. Mallins, the general manager, gives the total revenue of the Corporation tramways undertaking for the year 1913 as £715,120, and operating costs (including rental of leased lines) £451,657, leaving a gross profit of £263,453. The latter amount had been apportioned: To interest, £48,971; sinking fund and repayment of loans, £60,319; reserve, renewal, and depreciation account, £54,163; and contribution in aid of the general rate, £100,000. The net profit amounted to £154,162, an increase of £20,305. The sum set apart for sinking fund and redemption of debt since the tramways were taken over by the Corporation in 1897 has amounted to £1,091,771, and to reserve, renewal, and depreciation, £765,803. The amount contributed in relief of the rates was £472,899. The sum paid in rates and taxes amounted to £356,983. Passengers carried during the year numbered 144,085,927, as against 134,449,967, an increase of 7·3 per cent. The receipts were £677,881, as compared with £631,071, an increase of 7·4 per cent.; and the miles run were 13,442,605, against 12,590,408, an increase of 6·8 per cent. The average earnings per car-mile for 1913 amounted to 12·10d., as against 12·03d. in 1912, and 11·64d. in 1911. The traffic receipts and car-mile earnings, together with the passengers carried, were the highest recorded in connection with the Liverpool tramways. In July the King and Queen's visit to the city greatly increased the takings. The percentage of operating costs to total revenue was 63·2, as against 63·6 in 1912, and 64·7 in 1911.

NON-FOULING AND FLEXIBLE TROLLEY HEADS.

The once much-discussed question of type of contact for trolley wires—whether bow or wheel—seems, so far as this country is concerned, to have been quietly settled by steady practical use, in favour of the second method; and nearly all our electric tramways using overhead wires are provided with trolley heads and wheels. On the Continental systems—or at any rate a great number of them—the preference is rather for a bow contact, perhaps largely because this type was introduced on some of the first lines equipped, and has therefore persisted in one form or another, even on the newer lines.

It will without doubt interest those in control of such systems—as well as the users of ordinary trolley wheels—to see that improvements are now available in the design and construction of such wheels—the tendency being not merely towards simplicity and cheapness, but also in the direction of safety. That is, the trolley wheel which, as compared with the bow, has been accused of much greater liability to damage the overhead structure by slipping off the trolley wire and becoming entangled in the suspension—can now be looked upon by the tramway engineer without apprehension, since this one small difficulty of running off can easily be avoided or rendered harmless, whilst the many admitted advantages of an under-running wheel are preserved to their full extent.

One of the most ingenious and successful trolley wheel heads which we remember to have inspected, and which appears capable of giving every satisfaction in this way, is that devised by Messrs. Holmes and Allen. This device we described and illustrated at the time of its invention, but as the latest patterns have been considerably improved, being altogether lighter and stronger, we need make no apology for again alluding to the two forms of wheel now on the market.



Collapsible Type of Holmes and Allen Trolley Head.

The first of these is a collapsible non-fouling head, in which the trolley wheel fork is carried on a pin fixed in the harp bracket. The pin passes through a slot in the wheel fork base or socket, controlled by a spring, and the bottom end of the fork socket is provided with a pin which slides in a curved and straight slot in the harp bracket.

Normally, of course, the wheel and wheel fork are kept under tension in an upright position against the trolley wire, and the bottom pin of fork socket lies at the end of straight section of slot in the harp bracket; if, however, by any possibility the wheel should come off the wire, the small spring at once is relieved from the tension against trolley wire, and throws down the trolley wheel and fork into a horizontal position as shown in our illustration, thus enabling the trolley head to pass with safety any cross suspension wire that it may encounter.

The wheel and wheel fork are thereafter pulled back again into position by means of the trolley rope, which is attached to an eye extension of the socket or base.

The other form of trolley head and wheel is for ordinary centre running work. This wheel is mounted on a spindle, which runs in two blocks sliding against springs, and fitted into slots (slightly inclined) cut into the head bracket. Any irregularity of trolley wire tending to bind on either side of the wheel, causes one or other of the springs to push the spindle forward, and so maintain the wheel in line with the wire. In fact, the wheel may be said to "float," and thereby accommodates itself to every variation in the wire. Less tension on the trolley pole is thus required, and great saving obtained in wear and tear of wire, sparking, and cutting of the sides of ears, etc.; besides which the liability of the wheel to run off is also greatly reduced. The total weight of this latter type in not more than 7 lb.

These trolley heads and wheels have already been supplied, we are informed, to at least 35 different electric tramway systems in this country, amongst which may be noted Manchester and Leicester; and the sole rights of manufacture and supply are now in the hands of the Equipment and Engineering Company, of 2 and 3, Norfolk Street, Strand, London, W.C., to whom we are indebted for these particulars and illustration.

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TRAMWAY AND RAILLESS TRACTION, ETC., BILLS IN PARLIAMENT.

An official return shows that 26 bills relating to tramways, railless electric traction, motor omnibuses, etc., will be considered during the present session of Parliament. In these undertakings the construction of 34 miles of tramway, and the raising of sums of money amounting in the aggregate to £1,044,481 is proposed. As compared with 1913, the number of bills shows a decrease of 2, and the capital proposed a decrease of £628,717.

Details of the bills are appended:

BELFAST CORPORATION.

Borrowing Powers.—*For work in connection with lands at Drumnadrough, £15,000. To empower the Corporation of Belfast to raise additional moneys for certain purposes connected with their tramways undertaking.

BIRKENHEAD CORPORATION.

Borrowing Powers.—*For motor omnibuses, £17,000; for depots, etc., £3,000. *Inter alia*, to authorise the Corporation of Birkenhead to provide and run motor omnibuses within and outside the borough.

BIRMINGHAM CORPORATION.

Borrowing Powers.—*For construction of new tramways, £144,209; for electrical equipment, £34,917; for rolling stock, £18,000. *Length of Tramways.*—Double line, 10 miles 8 chains; single line, 1 mile 5 chains. *Inter alia*, to authorise the Corporation of Birmingham to construct and work additional tramways, and to provide and run motor omnibuses within the city; and to apply certain provisions of earlier Acts of the Corporation.

BOLTON CORPORATION.

Borrowing Powers.—For new tramways, £30,242. *Length of Tramways.*—Double line, 1 mile 17 chains; single line, 1 mile 21 chains. *Inter alia*, to authorise the Corporation of Bolton to construct and work additional tramways, and to provide and run motor omnibuses within the borough, to use trailer and coupled carriages, to require intending passengers to wait in lines or queues, and to reserve carriages for special purposes.

BOURNEMOUTH DISTRICT RAILLESS TRACTION.

Capital.—By shares, £10,000; by loan, £3,333. To incorporate the bournemouth District Railless Traction Company; to authorise the company to provide and work trolley vehicles on specified routes in the borough of Bournemouth, to acquire lands by agreement and to erect a generating station; to empower the Board of Trade to authorise new routes by Provisional Order: to provide as to the future purchase of the undertaking by the Corporation of Bournemouth; and for other purposes.

BRISTOL CORPORATION (TRAMWAYS).

Borrowing Powers.—For the acquisition of any tramways or tramway undertaking purchased by the Corporation, whether compulsorily or by agreement, the sum requisite. To empower the Corporation of Bristol to work any tramways purchased by or belonging to them, and to enter into agreements for the purchase or working of tramways within or outside the city; and for other purposes.

CHESTERFIELD CORPORATION.

Borrowing Powers.—*For construction of new tramways, £8,000; for electrical equipment and for general purposes of tramway undertaking, £10,500. *Length of Tramways.*—Single line, 63 chains. *Inter alia*, to authorise the Corporation of Chesterfield to construct and work additional tramways within and adjacent to the borough.

CLECKHEATON URBAN DISTRICT COUNCIL.

Proposed Borrowing Powers.—*For motor omnibuses, £4,800; for lands and buildings for the purposes of the motor omnibuses, £1,400. *Inter alia*, to authorise the Cleckheaton Urban District Council to provide and run motor omnibuses within and outside their district, and to enter into agreements with other parties as to the working, etc., of the motor omnibuses.

GREAT YARMOUTH HAVEN BRIDGE.

Borrowing Powers.—*For construction and equipment of new tramways, £8,443. *Length of Proposed Tramways.*—Double line, 24 chains; single line, 1 chain. *Inter alia*, to authorise the Corporation of Great Yarmouth to construct and work additional tramways in the borough, to abandon certain portions of existing tramway, and to divert certain sidings of the Great Eastern Railway Company.

LEEDS CORPORATION.

Borrowing Powers.—*For construction of new tramways and other purposes of tramway undertaking, £60,012; for trolley vehicles, £12,000; for electrical equipment of tramways and trolley vehicles, £28,562; for land, buildings, etc., for purposes of tramways and trolley vehicles, £42,636. *Length of Tramways.*—Double line, 3 miles 66 chains; single line, 1 mile 32 chains. *Inter alia*, to authorise the Corporation to construct and work additional tramways in and adjacent to the city, to run trolley vehicles over additional routes, and to provide and run motor omnibuses within the city.

LONDON COUNTY COUNCIL (TRAMWAYS AND IMPROVEMENTS).

Borrowing Powers.—For construction and equipment of new tramways and purchase of lands therefor, and for other purposes of tramway undertaking. £151,850. *Length of Tramways.*—Double line, 2 miles 66 chains; single line, 18 chains. To authorise the London County Council to construct and work additional tramways, to take lands, to make street improvements, and to enter into agreements with the Corporation of the City of London with respect to certain matters relating to the new tramways; to apply certain provisions of earlier Acts; to amend the London County Tramways Acts, 1896; to provide for contributions by Councils of certain Metropolitan boroughs towards cost of of street works; and for other purposes.

LONDON UNITED TRAMWAYS.

To empower the London United Tramways, Limited, to enter into working, interchange of traffic, etc., agreements with other parties, and agreements with local authorities for variation of the periods within which and the terms upon which the company's tramways may be purchased compulsorily; to use trailer and coupled carriages; to reserve carriages for special purposes; to carry excess passengers over licensed number on certain occasions; to hold or lease surplus lands; and for other purposes.

MANCHESTER CORPORATION.

Inter alia, to authorise the Corporation of Manchester to provide and run motor omnibuses within and on certain routes outside the city; and to extend the time for construction of certain tramways authorised by earlier Acts.

NEWCASTLE-UPON-TYNE CORPORATION.

Proposed Borrowing Powers.—For construction of new tramways, £45,671; equipment, £11,900; for and in relation to tramway purposes, including motor omnibuses, such sums as the Board of Trade may from time to time sanction. *Length of Tramways.*—Double line, 73 chains; single line, 3 miles 47 chains. To authorise the Corporation of Newcastle-upon-Tyne to construct and work additional tramways in the urban districts of Longbenton and Weetslade, to take lands, to make street improvements, to use trailer and coupled carriages, to reserve carriages for special purposes; and to run motor omnibuses in the urban district of Longbenton; and for other purposes.

NEWPORT CORPORATION.

Proposed Powers.—*For construction of new tramways, £7,250; for motor omnibuses and sheds in connection therewith, £6,000. *Length of Tramways.*—Double line, 25 chains. *Inter alia*, to authorise the Corporation of Newport to construct and work additional tramways within the borough, and to run motor omnibuses within the borough and also along certain routes in the rural district of St. Mellons.

NORTH EASTERN RAILWAY.

Capital.—See Railway Bills. *Inter alia*, to authorise the North Eastern Railway Company to provide and work trolley vehicles along specified routes in the city of Newcastle-upon-Tyne and in the borough of Gateshead (see also Railway Bills).

NORWICH ELECTRIC TRAMWAYS.

Capital.—By shares, £36,000; by loan, £12,000. *Length of Tramways.*—Double line, 1 mile 11 chains; single line, 1 mile 77 chains. To authorise the Norwich Electric Tramways Company to construct additional tramways, to abandon portions of existing tramways, to take lands, to make street improvements, and to provide and run motor omnibuses and vans; to provide as to the future purchase of the new tramways (which will be situate in part outside the city) by the Norwich Corporation; and for other purposes.

OXFORD AND DISTRICT TRAMWAYS.

Proposed Borrowing Powers.—Such sums as may be necessary. To authorise the city of Oxford Electric Tramways, Limited, and the Corporation of Oxford to make and carry into effect agreements for the purchase and removal by the Corporation of the company's tramways, and the provision and working by the company of a service of motor omnibuses in lieu thereof; to extend the time for the construction of tramways and works and the purchase of lands under the Oxford and District Tramways Acts, 1907 and 1909; and for other purposes.

POOLE, SANDBANKS, AND WESTBOURNE RAILLESS TRACTION.

To authorise the Sandbanks Railless Electric Car Company, Limited, to provide and work trolley vehicles on specified routes in the borough of Poole; to empower the Board of Trade to authorise new routes by Provisional Order; and for other purposes.

PRESTON CORPORATION.

Proposed Powers.—*For construction and electrical equipment of new tramways, £26,000. *Length of Tramways.*—Double line, 73 chains

*And with the sanction of the Board of Trade or of the Local Government Board, as the case may be, such further sums as may be required.

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single line, 1 mile 34 chains. *Inter alia*, to authorise the Corporation of Preston to construct and work additional tramways in the borough and in the urban district of Fulwood, to provide and run motor omnibuses within the borough, and to enter into agreements for the supply of electrical energy to the owner or lessee of any trolley vehicle system in any district adjacent to the borough.

READING CORPORATION.

Proposed Powers.—*For construction of new tramways, and other purposes of tramway undertaking, £3,100; for trolley vehicles, £6,800; for electrical equipment, etc., of tramways and trolley vehicles, £6,000; for motor omnibuses, £3,500; for depot accommodation for trolley vehicles and omnibuses, £2,400. *Length of Tramways.*—Double line, 18 chains. *Inter alia*, to authorise the Corporation of Reading to construct additional tramways, to provide and work trolley vehicles on specified routes, and to run motor omnibuses, all within the borough, and to empower the Board of Trade to authorise new trolley routes by Provisional Order.

ST. ANNE'S-ON-THE-SEA IMPROVEMENT.

Proposed Powers—*For motor omnibuses, £1,800; for lands and depot in connection therewith, £900. *Inter alia*, to authorise the St. Anne's-on-the-Sea Urban District Council to provide and run motor omnibuses within their district, and to enter into agreements with the Blackpool, St. Anne's, and Lytham Tramways Company, Limited, for through fares, interchange of traffic, etc.

SHEFFIELD CORPORATION.

Proposed Powers.—*For construction and equipment of new tramways, £2,100; for general purposes of tramway undertaking, £121,000; for motor omnibuses, £19,000. *Length of Tramway.*—Double line, 7 chains. *Inter alia*, to authorise the Corporation of Sheffield to construct and work an additional tramway within the city and to provide and run motor omnibuses in certain areas outside the city.

SKEGNESS URBAN DISTRICT COUNCIL.

Borrowing Powers.—*For motor omnibuses, £1,800; for depot, £900. *Inter alia*, to authorise the Skegness Urban District Council to provide and run motor omnibuses within their district.

WALSALL CORPORATION.

Borrowing Powers.—*For construction of new tramway, £3,062; for rolling stock for new tramway and existing tramways, £9,000; for trolley vehicles, £16,500; for electrical equipment, etc., of new tramway, existing tramways and trolley vehicles, £22,394; for omnibuses, £19,800; for lands and buildings for purposes of trolley vehicles and omnibuses, £3,500. *Length of Tramway.*—Double line, 18 chains. *Inter alia*, to authorise the Corporation of Walsall to construct and work an additional tramway within the borough, to provide and work trolley vehicles on specified routes within and adjacent to the borough, and to provide and run motor omnibuses within and on certain routes outside the borough, and to empower the Board of Trade to authorise new trolley routes by Provisional Order.

YORK CORPORATION.

Proposed Powers.—*For trolley vehicles, £9,800; for electrical equipment, etc., of trolley vehicles, £8,700; for motor omnibuses, £12,000; for lands and buildings for purposes of light railway, trolley vehicle, and motor omnibus undertakings, £21,700. *Inter alia*, to authorise the Corporation of York to provide and work trolley vehicles on specified routes, and to provide and run motor omnibuses, all within the city, to empower the Light Railway Commissioners to make Orders under the Light Railways Acts, 1896 and 1912, authorising new trolley routes, and to empower the Corporation to erect, purchase, or take on lease dwelling-houses for persons employed in their light railway, trolley vehicle, and omnibus undertakings. *Capital and Borrowing Powers.*—By shares, £46,000. By loan, £998,481. *Length of Proposed Tramways.*—Double line, 22 miles 6 chains; single lines, 11 miles 58 chains.

PROVISIONAL ORDERS.

Application has been made to the Board of Trade for two Provisional Orders, viz.:

ROTHERHAM CORPORATION.

Length of Proposed Tramways.—Single line, 69 chains. *Estimated Cost of Proposed Tramways.*—£8,041. To authorise the Corporation of Rotherham to construct and work additional tramways in the borough; and for other purposes.

RAILLESS ELECTRIC TRACTION PROVISIONAL ORDER.

(Under powers of Special Act.)

WESTERN VALLEYS (MONMOUTHSHIRE) EXTENSION.

Length of Proposed Routes.—2 miles 29 chains. *Proposed Capital.*—By shares, £20,000; by loan, £6,666. To empower the Western Valleys (Monmouthshire) Railless Electric Traction Company to extend their authorised routes for trolley vehicles in the urban district of Abertillery; and for other purposes.

BRISTOL TRAMWAYS AND CARRIAGE COMPANY.

The report for 1913 recommended a final dividend at the rate of 5 per cent. per annum, making 4½ per cent. for the year, and £8,361 is placed to reserve fund for contingencies and renewals. A bill is being promoted to empower the Corporation of Bristol to work any tramways purchased or belonging to them. There are no tramways belonging to the Corporation, neither have they as yet been able to decide whether or not to purchase any tramways. The directors point out that the bill is, in fact, premature, and without precedent, and will receive their determined opposition. A comparison of the figures is given below:

	1912.	1913.	Increase.
	£	£	£
Tramway receipts	230,539	243,686	13,147
Carriage receipts	133,745	174,701	40,956
Net revenue	68,202	80,233	12,031
Reserve fund	241,289	247,564	6,275

The receipts from the tramways showed an increase of £13,147, or 5⅜ per cent., and those of the carriage department increased £40,956, or 30½ per cent. There are 17 distinct tramway services, and 15 motor omnibus services, and the latter will be further increased in the ensuing summer. A large additional number of pleasure chars-a-bancs are being constructed, as this branch of the business is rapidly developing.

Sir George White, the chairman, moved the adoption of the report at the annual meeting on February 18. He observed that whilst the company's gross income was rapidly growing, it was interesting to observe that the relative positions of the two departments were almost as quickly changing. In 1908 the receipts were 82 per cent. tramways and 18 per cent. carriage; in 1909, 75 per cent. tramways and 25 per cent. carriage; in 1910, 71 per cent. tramways and 29 per cent. carriage; in 1911, 68 per cent. tramways and 32 per cent. carriage; in 1912, 63½ per cent. tramways and 36½ per cent. carriage; and in 1913, 58 per cent. tramways and 42 per cent. carriage. The total gross revenue for 1913 amounted to £423,816, made up of £243,700 tramways, £174,700 carriage, and £5,400 miscellaneous. The directors had continued the old provident society for the employees, who were thus looked after better than they could be in State, friendly, or trade society. This was highly appreciated by the men. In local rates the company paid £13,147, an increase of £2,123 for the year. By undertaking the construction and maintenance of their part of the Bristol streets and roads, the company saved the ratepayers another £20,000 or £25,000 a year. But there was another aspect in which they helped the rates. Assume for the moment that the Corporation had owned the tramways a few years ago, when the motor business began to develop, did they imagine the Council would have permitted it to grow? Whereas a commercial company, being the owners of the tramways, were enabled to start a great industry, and in the short space of six years to build up a business which had meant the expenditure of hundreds of thousands of pounds, and the creation of new employment for 1,500 men. They had 1,500 men on the tramways. They now had 3,000 in both departments. Was this no contribution to the rates? (Applause.) The expenditure under the heading of renewals, repairs, and maintenance totalled £129,498, or an increase over last year of £10,723. There remained a balance of net revenue of £80,234, as against £68,202 in 1912, an increase of £12,031. This £80,234 had been applied first in payment of interest on debenture stock, etc., and dividend on the preference shares, as also the interim dividend of 4 per cent. paid for the first half-year, these amounting in the total to £60,101, whilst they proposed that the balance should be appropriated in a final dividend for the half-year on the ordinary shares at the rate of 5 per cent. per annum, which required £11,771, and that there should be an addition to the reserve fund for contingencies and renewals of £8,361. To sum up last year's results, they took £54,000 more gross revenue, made an increased profit of £12,000, which had been disposed of, as to £5,600 in additional interest on prior charges, £2,400 more in the extra 1 per cent. dividend on the ordinary, and £4,000 more to reserve than was placed there last year, whilst the additional capital employed in the business was about £108,000. In a few weeks the company would go into the committee room of the House of Lords confident in the strength and justice of their case against the Corporation's bill.

The report was adopted, and Sir George White was re-elected a director.

Tramcar and Omnibus Stopping Places.—The National Society of Chauffeurs have forwarded the following resolution to the Commissioner of the Metropolitan Police: "That the attention of the Commissioner of Police be drawn to the grave dangers resulting from the practice of allowing tramcars and omnibuses to use the same stopping place, and that he be asked to issue an order forbidding omnibuses to stop within 50 ft. of a recognised tramway stopping place."

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Year Ended.	Electric Traction Inaugurated.	System.	Line open (single track). Mls. Chs.	Borrowing Powers.	Borrowing Powers Exercised.	Unexhausted Borrowing Powers.	Total Capital Expenditure.	Capital Expenditure per Mile of Single Track.	Loans Outstanding.	Loans Repaid and Sinking Fund.	Depreciation, Renewal and Reserve Funds.	Gross Receipts. Traffic.	Other.	Total.
Aberdeen ...	†May 31, 1913	Dec., 1899	E.	27 66	350,000	..	...	350,590	12,599	192,660	157,929	143,468	79,125	1,041	80,166
Accrington ...	†Mar. 31, 1913	Aug., 1907	,,	10 53	169,675	134,670	35,800	134,525	12,619	116,976	17,694	13,200	27,419	403	27,822
Ashton-u-Lyne..	†Mar. 25, 1913	Aug., 1902	...	8 15	130,070	108,099	21,971	108,099	13,203	79,589	28,510	2,150	22,206	285	22,491
Ayr	†May 15, 1913	Sept., 1901	,,	7 49	...	...	...	85,445	11,224	78,933	18,044	14,918	15,626	670	16,296
Birmingham ...	†Mar. 31, 1913	Jan., 1904	,,	108 32	2,302,001	2,089,194	212,807	1,981,588	18,280	1,874,109	215,084	220,369	574,248	7,318	581,566
Blackburn ...	†Mar. 25, 1913	Mar., 1899	,,	24 63	408,174	342,474	65,700	334,924	13,512	254,600	167,381	1,000	63,440	3,243	66,683
Blackpool ...	†Mar. 31, 1913	June, 1899	,,	21 31	453,798	301,796	152,002	301,796	14,115	301,796	114,086	15,126	73,155	1,011	74,166
Bolton	†Mar. 31, 1913	Dec., 1899	,,	47 17	552,208	551,019	1,189	559,107	11,842	338,439	162,580	55,901	135,149	1,313	136,462
Bradford ...	†Mar. 31, 1913	July, 1898	,,	(h)103 69	1,269,568	982,398	287,170	1,002,566	9,653	607,928	388,335	89,072	280,758	18,345	299,103
Brighton	†Mar. 31, 1913	Nov., 1901	,,	17 15	358,620	279,000	80,715	277,914	16,170	223,556	55,653	6,708	51,780	2,018	53,798
Burnley	†Mar. 31, 1913	Dec., 1901	,,	22 13	388,052	339,125	48,927	231,601	10,450	179,498	56,652	48,212	79,641	249	79,890
Burton-on-Trent	†Mar. 31, 1913	Aug., 1903	,,	9 60	108,632	104,562	4,070	106,225	10,895	50,583	53,979	8,966	14,383	1,304	15,687
Bury	†Mar. 31, 1913	June, 1903	,,	21 14 (b)13 21	407,800	280,775	127,025	283,005	13,365	262,135	42,877	(l)24,571	67,370	284	67,654
Chester	†Mar. 25, 1913	April, 1903	,,	6 35	92,991	82,380	10,611	82,934	12,883	69,727	12,785	2,968	12,272	458	12,730
Chesterfield ...	†Mar. 31, 1913	Dec., 1904	,,	5 8	95,000	70,500	24,500	69,575	13,642	58,510	11,990	5,031	12,220	474	12,694
Colchester ...	†Mar. 31, 1913	July, 1904	,,	7 75	70,748	69,555	1,193	69,401	8,743	53,425	17,049	Nil.	10,281	477	10,758
Croydon	†Mar. 31, 1913	June, 1906	,,	19 10	287,689	287,689	Nil	284,847	14,894	230,968	87,264	42,453	90,543	1,921	92,464
Darlington ...	†Mar. 31, 1913	June, 1904	,,	8 71	107,500	76,263	31,237	76,322	8,587	56,888	19,434	5,726	11,842	334	12,176
Darwen	†Mar. 31, 1913	Oct., 1900	,,	7 13	93,400	86,300	7,100	86,300	12,048	57,320	28,280	7,450	14,244	1,176	15,420
Derby	†Mar. 31, 1913	July, 1904	E.	22 5	...	...	...	242,785	11,004	157,213	85,572	(a)4,486	E 46,820	1,030	47,850
			H.		...	...	...	...	...	...	...	...	H 394	22	416
Doncaster ...	†Mar. 31, 1913	June, 1902	E.	12 42	...	...	..	99,172	7,918	80,400	14,741	780	19,928	334	20,262
Dundee	†May 15, 1913	July, 1900	,,	27 38	(f)	345,450	...	352,663	12,835	262,038	83,411	71,823	63,395	1,650	65,045
East Ham ...	†Mar. 31, 1913	June, 1901	,,	14 32	190,643	190,242	401	191,583	13,307	148,515	58,075	5,097	57,050	610	57,660
Exeter	†Mar. 31, 1913	April, 1905	,,	7 0	106,000	86,111	19,889	86,111	12,301	69,376	17,209	5,915	16,748	Nil	16,748
Gloucester ...	†Mar 31, 1913	April, 1904	,,	15 0	191,000	144,243	46,757	147,692	9,846	111,051	16,816	750	16,177	1,168	17,345
Halifax	†Mar. 31, 1913	June, 1898	,,	54 70	449,263	412,876	36,387	414,246	7,549	299,480	105,948	27,379	104,947	1,026	105,973
Ilford	†Mar. 31, 1913	Mar., 1903	,,	11 28	149,633	149,633	Nil	149,500	13,171	109,912	39,721	5,611	24,361	2,407	26,768
Ilkeston	Mar. 31, 1912	May, 1903	,,	4 24	64,214	47,000	15,074	47,936	11,148	42,600	11,919	350	6,533	156	6,689
Ipswich	†Mar. 31, 1913	Nov., 1903	,,	14 70	116,471	114,300	2,171	114,838	7,720	98,858	16,305	8,180	22,575	829	23,404
Keighley	†Mar. 31, 1913	Oct., 1904	,,	6 9	50,934	47,328	3,606	47,328	7,745	32,468	16,961	942	8,845	313	9,158
Kilmarnock ...	†May 15, 1913	Dec., 1904	,,	5 47	65,000	52,625	12,375	53,191	9,519	44,766	7,379	4,017	8,543	248	8,791
Kirkcaldy ...	†May 15, 1913	Feb., 1903	,,	8 45	213,000	96,748	116,252	96,749	11,025	80,333	16,415	4,161	15,712	494	16,206
Lancaster ...	†Mar. 31, 1913	Jan., 1903	,,	4 65	60,000	51,550	8,450	43,432	9,022	36,200	13,838	3,000	5,437	143	5,580
Leith	†May 15, 1913	Aug., 1905	,,	17 73	275,000	237,300	37,700	236,155	14,572	186,500	50,800	514	34,664	1,030	35,694
Leyton	†Mar. 31, 1913	Dec., 1906	,,	18 40	306,427	306,371	56	295,376	15,966	249,165	48,876	3,445	68,809	1,558	70,367
Lincoln	†Mar. 31, 1913	Nov., 1905	S.	2 77	98,519	44,947	53,572	44,992	15,187	42,893	9,862	(a) 1,600	6,717	128	6,845
Liverpool ...	Dec. 31, 1913	Nov., 1898	E.	119 0	...	...	...	2,024,706	17,014	1,177,384	1,091,771	428,318	677,881	13,018	690,899
Lowestoft ...	Sep. 30, 1912	July, 1903	,,	4 6	94,230	87,031	7,199	87,031	21,357	67,833	13,067	...	10,781	17	10,798
Maidstone ...	†Mar. 31, 1913	July, 1904	,,	7 3	82,932	82,582	350	79,098	11,239	67,191	15,391	Nil.	9,761	535	10,296
Manchester ...	†Mar. 31, 1913	June, 1901	,,	188 30	2,355,689	2,034,371	321,318	2,061,791	10,945	1,543,504	437,305	479,683	876,023	11,624	887,647
Nelson	†Mar. 31, 1913	Feb., 1903	,,	3 69	38,000	37,832	168	37,832	9,795	30,118	7,714	...	10,240	51	10,291
Newport (Mon.)...	†Mar. 31, 1913	April, 1903	,,	14 28	219,250	196,250	23,000	193,191	13,463	164,763	31,487	9,095	37,555	995	38,550
Nottingham ...	†Mar. 31, 1913	Jan., 1901	,,	37 40	730,300	725,945	4,355	638,005	17,479	426,818	217,041	64,242	164,746	2,404	167,150
Oldham	†Mar. 25, 1913	May, 1902	,,	28 6 (b) 8 31	516,923	440,204	76,719	442,174	15,750	320,725	118,217	2,135	108,003	2,574	110,577
Perth	†May 15, 1913	Nov., 1905	,,	6 60	90,000	78,350	11,650	78,629	11,649	63,340	15,489	1,673	8,761	509	9,270
Plymouth ...	†Mar. 31, 1913	Sept., 1899	,,	15 0	...	189,512	...	219,417	14,628	90,925	37,826	17,550	37,925	1,123	39,048
Pontypridd ...	†Mar. 31, 1913	Mar., 1905	,,	8 48	136,019	135,919	100	137,148	15,946	109,757	26,052	Nil	21,580	313	21,893
Rawtenstall ...	†Mar. 31, 1913	May, 1909	,,	15 71	193,290	181,526	11,764	181,776	14,442	162,451	19,075	3,177	25,410	1,126	26,536
Rochdale	†Mar. 31, 1913	May, 1902	,,	(i) 40 2	356,991	347,782	9,209	353,066	15,401	347,782	83,475	5,901	80,058	287	80,345
Rotherham ...	†Mar. 31, 1913	Jan., 1903	,,	12 2	...	...	...	162,504	13,542	144,850	27,250	21,203	40,232	26	40,258
			R.T	...	...	...	...	...	...	...	...	...	2,457	Nil	2,457
Salford	†Mar. 31, 1913	Oct., 1901	E.	75 64	1,050,666	723,669	326,997	723,672	9,599	536,791	258,977	45,699	260,365	486	260,851
Southampton ...	†Mar. 31, 1913	Jan., 1900	,,	18 35	276,755	252,164	24,591	255,154	13,974	170,637	79,732	12,595	64,186	2,348	66,534
Southend-on-Sea	†Mar. 31, 1913	July, 1901	,,	11 49	130,000	129,961	39	143,808	12,384	116,940	12,784	3,045	34,453	465	34,918
Southport ...	†Mar. 31, 1913	July, 1900	,,	(d) 10 63	292,000	196,500	95,500	118,708	11,004	153,530	42,970	442	16,928	386	17,314
South Shields ...	†Mar. 31, 1913	Mar., 1906	,,	10 21	251,883	174,936	76,947	172,476	16,806	150,228	30,818	20,838	33,654	498	34,152
Stalybridge, H., M., D.	Mar 31, 1913	May, 1904	,,	27 57	325,270	274,990	44,280	279,778	10,096	224,700	56,290	500	34,961	677	35,638
Stockport ...	Mar. 31, 1912	Aug., 1902	,,	27 50	305,028	234,500	70,528	238,199	8,623	176,002	58,498	54,219	59,594	1,245	60,839
Sunderland ...	†Mar. 31, 1913	Aug., 1900	,,	20 28	308,699	303,211	5,488	305,234	14,999	182,318	111,943	31,883	68,507	364	68,871
Wallasey ...	†Mar. 31, 1913	Mar., 1902	,,	19 69	198,167	195,290	2,877	215,424	10,846	167,924	58,733	11,927	57,458	564	58,022
Walsall	†Dec. 31, 1913	Dec., 1902	,,	19 44	188,145	188,100	45	183,351	9,378	159,561	58,366	33,873	32,991	682	33,673
Walthamstow ...	†Mar 31, 1913	June, 1905	,,	12 42	198,000	180,000	18,000	173,241	13,851	160,982	19,018	4,687	37,191	785	37,976
Warrington ...	†Mar. 31, 1913	April, 1902	,,	9 52	103,674	102,896	778	102,128	10,583	73,830	29,068	10,000	22,903	302	23,205
West Ham ...	†Mar. 31, 1913	Feb., 1904	,,	30 4	563,478	551,463	12,015	556,878	18,532	539,650	90,402	40,352	137,766	676	138,442
Wigan	†Mar. 31, 1913	April, 1901	,,	(k) 34 42	...	...	...	...	...	...	...	...	71,268	1,515	72,783
Wolverhampton	†Mar. 31, 1913	April, 1902	S.	21 40	279,733	265,616	14,117	278,615	12,959	217,882	47,734	50,220	53,963	797	54,760
Yarmouth (Gt.)...	†Mar. 31, 1913	June, 1902	E.	14 32	144,500	119,750	24,750	121,899	8,465	111,450	22,737	6,070	23,625	508	24,133

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast	†Mar. 31, 1913	Nov., 1905	E.	98 54	1,567,674	1,386,232	181,442	1,389,713	14,037	1,381,200	144,342	117,769	250,589	3,788	254,377
Bexley	Mar. 31, 1912	Oct., 1903	,,	6 42	99,942	96,984	2,958	96,924	14,854	78,800	18,184	(j) 1,074	13,826	1,542	15,368
Birkenhead	†Mar. 31, 1913	Feb., 1901	,,	24 7	375,848	364,854	10,994	366,610	15,220	247,012	117,863	18,070	61,202	4,365	65,567
Bournemouth ...	†Mar. 31, 1913	July, 1902	,,	(e) 29 62	449,027	...	...	435,788	19,500	221,797	134,815	13,733	95,695	317	96,012
Cardiff	†Mar. 31, 1913	May, 1902	,,	31 66	818,573	787,292	19,564	783,270	24,612	542,488	244,803	92,968	129,265	21,361	150,626
Coventry ...	†Mar. 31 1913	Jan.. 1912	,,	15 40	220,538	216,436	4,102	211,298	13,632	216,436	3,287	2,876	38,996	157	39,153
Glasgow	†May 31, 1913	Oct., 1898	,,	193 47 (b) 2 52	3,714,266	3,553,584	160,682	3,694,143	18,595	2,479,408	1,074,177	2,079,645	1,007,653	3,891	1,011,544
Huddersfield ...	†Mar. 31, 1913	Feb., 1901	,,	46 0	646,284	407,142	239,142	417,408	9,074	255,177	161,349	19,132	106,586	3,123	109,709
Hull	†Mar. 31, 1913	July, 1899	,,	30 44	677,673	541,871	135,802	542,371	17,753	527,641	147,925	125,407	157,048	1,393	158,441
Leeds	† Mar. 31, 1913	Aug., 1897	,,	112 62	1,603,455	1,546,422	57,033	1,511,588	13,406	1,220,041	482,698	4,637	407,552	3,979	411,531
Leicester... ...	†Dec. 31, 1913	May, 1904	,,	37 0	929,120	727,405	201,715	739,982	19,999	602,478	129,807	100,000	147,458	17,059	164,517
London	†Mar. 31, 1913	...	H.	15 70	...	...	...	...	...	...	...	...	37,544	879	38,423
		May, 1903	C.E	272 40	(c)	(c)	(c)	12,268,015	...	11,734,060	2,515,747	906,796	2,143,559	69,748	2,213,307
N'castle-on-Tyne	†Mar. 31, 1913	Dec., 1901	E.	61 0	1,522,010	1,251,047	270,963	1,231,080	20,230	939,120	383,921	119,407	228,091	10,114	238,205
Northampton ...	†Mar. 31, 1913	July, 1904	,,	9 13	239,800	127,255	112,545	135,481	14,786	91,176	36,078	10,499	27,250	899	28,149
Portsmouth ...	†Mar. 31, 1913	Sep.. 1901	,,	30 66	662,280	698,319	...	712,792	23,118	647,489	234,258	94,934	108,087	1,745	109,832
Preston	†Mar. 31, 1913	June, 1904	,,	17 16	224,102	187,270	36,832	187,269	10,888	119,790	42,091	36,841	42,964	306	43,270
Reading	†Mar. 31, 1913	July, 1903	,,	13 14	235,000	234,000	1,000	229,372	17,409	169,642	59,896	17,831	32,984	1,030	34,014
Sheffield	†Mar. 25, 1913	Sep.. 1899	,,	77 67	1,727,596	1,413,980	313,616	1,411,959	18,140	1,067,897	418,292	27,521	358,656	3,189	361,845
Wellington, N.Z.	†Mar. 31, 1913	...	,,	30 7	496,423	496,423	Nil	606,771	20,165	496,423	39,486	109,066	149,446	826	150,272

C—Electric conduit system. E—Electric trolley system. H—Horse lines RT—Railless trolley system. S—Surface contact system.
(a) Accident insurance fund. (b) Additional lines leased and worked. (c) Conferred by Annual Money Act, which limits amount for each financial year. Powers not exercised are lapsed. (d) Not including 8 m. 78 ch. leased lines (f) Unlimited. (h) Includes 1½ miles railless trolley route. (i) 17 mi. 8 chn. single track leased.
(j) Including £574 accident insurance fund. (k) Not including 10 miles 3 chains single track lines leased. (l) Including Insurance.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Working Expenses.					Gross Profit on Working.	Additions to Gross Profit.	Deductions from Gross Profit.						Net Surplus + or Deficit −
	Traffic.	General.	Repairs & Maintenance.	Power.	Total.			Interest.	Sinking Fund.	Income Tax.	Depreciation & Renewal	Sundries.	Total.	
Aberdeen	20,710	9,404	5,954	7,138	43,206	36,960	472	6,839	4,661	...	13,407	...	24,907	+ 12,525
Accrington	6,839	1,870	2,102	4,644	15,455	12,367	...	4,000	3,693	127	...	...	7,820	+ 4,563
Ashton-und'r-Lyne	4,840	1,754	2,118	3,278	11,990	10,501	...	2,727	3,651	485	500	371	7,734	+ 2,767
Ayr	3,486	1,964	1,604	1,989	9,043	7,253	...	1,972	1,943	122	2,041	...	6,078	+ 1,175
Birmingham	160,277	40,898	68,278	100,726	370,179	211,387	11,479	65,672	49,946	...	...	5,896	121,514	+ 101,352
Blackburn	14,863	4,262	12,392	10,999	42,516	24,167	110	5,292	14,909	206	...	...	20,407	+ 3,870
Blackpool	15,992	5,132	9,286	9,272	39,682	54,484	...	(h)9,184	6,969	...	8,000	...	24,153	+ 10,331
Bolton	29,821	8,646	15,984	19,767	74,213	62,241	1,114	(h)11,189	17,197	1,095	18,715	219	48,415	+ 14,943
Bradford	83,763	24,458	46,061	46,271	200,553	98,550	4,045	20,735	31,926	3,653	32,921	4,360	93,595	+ 9,000
Brighton	14,309	4,028	12,853	8,316	39,506	14,292	27	7,800	5,560	...	27	...	13,360	+ 932
Burnley	18,718	5,306	9,525	15,881	49,430	30,460	...	5,662	6,491	893	...	(f)2,873	15,919	+ 14,541
Burton-on-Trent	5,111	1,322	2,903	2,998	12,334	3,353	...	1,406	1,418	...	1,500	...	4,324	− 971
Bury	14,761	4,349	6,633	8,026	33,769	33,885	337	(k)7,974	4,824	244	...	(w)11,608	24,650	+ 9,572
Chester	3,349	1,574	878	2,203	8,004	4,726	93	(h)2,761	1,018	...	1,040	...	4,819	...
Chesterfield	2,739	1,230	1,912	2,110	7,991	4,703	253	2,287	1,849	...	...	...	4,136	+ 820
Colchester	2,825	1,189	1,771	2,508	8,293	2,465	48	(h) 2,159	2,319	...	...	...	4,478	− 1,965
Croydon	29,571	6,806	13,300	16,541	66,218	26,246	907	7,994	7,428	1,145	...	...	16,567	+ 10,586
Darlington	4,192	754	1,912	1,945	8,811	3,365	102	2,010	1,966	105	404	59	4,544	− 1,077
Darwen	3,594	831	3,096	2,395	9,916	5,504	141	2,298	2,191	...	1,050	...	5,539	+ 106
Derby	E 16,388 H 631	2,621 ...	4,768 73	8,200 ...	31,977 704	15,873 def. 288	547	6,388	3,363	...	310	(l) 300	10,361	+ 6,059
Doncaster	4,364	1,156	4,698	3,561	13,779	6,483	84	2,876	1,737	...	664	...	5,277	+ 1,290
Dundee	16,477	5,607	7,122	10,216	39,422	25,623	...	8,606	6,020	233	9,254	...	24,113	+ 1,510
East Ham	17,280	6,330	11,722	10,072	45,404	12,256	...	(h) 5,806	6,725	...	...	454	12,985	− 729
Exeter	4,511	1,175	1,311	3,499	10,496	6,252	...	(h) 2,347	1,814	48	...	...	4,209	+ 2,043
Gloucester	6,891	1,687	3,290	1,914	13,782	3,563	...	(h)4,502	2,772	...	750	...	8,024	− 4,461
Halifax	27,116	8,306	15,263	18,976	69,661	36,312	51	10,159	10,562	...	6,701	1,760	29,182	+ 7,181
Ilford	9,482	2,424	4,116	4,279	20,301	6,467	557	4,894	4,146	...	...	...	9,040	− 2,016
Ilkeston	2,359	579	1,613	1,476	6,027	662	157	1,578	1,644	...	...	210	3,432	− 2,613
Ipswich	8,072	1,827	4,015	3,502	17,416	5,988	...	(h)3,642	2,078	...	...	...	5,720	+ 268
Keighley	2,692	768	899	1,612	5,971	3,187	179	1,116	1,881	...	...	(n) 369	3,366	...
Kilmarnock	2,921	599	800	1,633	5,953	2,838	...	(h)1,623	1,233	3	1,160	28	4,047	− 1,209
Kirkcaldy	4,728	1,158	1,525	2,636	10,047	6,159	...	2,660	1,608	...	410	110	4,788	+ 1,370
Lancaster	2,237	474	872	1,621	5,204	376	80	1,243	1,467	...	...	...	2,710	− 2,254
Leith	9,204	2,631	4,213	3,468	19,516	16,178	272	(h)6,343	7,750	15	...	70	14,176	+ 2,274
Leyton	(p)21,929	6,544	11,592	12,875	52,940	17,427	133	10,048	8,064	...	...	228	18,340	− 780
Lincoln	1,478	625	989	925	4,017	2,828	153	1,529	1,071	...	...	...	2,600	+ 381
Liverpool	180,226	61,361	84,026	121,185	446,798	244,101	24,220	48,971	60,318	...	(d)54,163	e) 4,869	168,321	+ 100,000
Lowestoft	3,285	796	2,115	2,813	9,009	1,789	..	(h) 2,261	1,562	...	...	350	4,173	− 2,384
Maidstone	2,405	1,018	1,469	1,903	6,795	3,501	58	2,687	2,243	...	...	32	4,962	− 1,403
Manchester	255,604	83,574	84,879	133,681	557,738	329,909	14,282	55,771	52,394	8,613	96,351	(e)31,062	244,191	+ 100,000
Nelson	2,425	677	1,320	2,006	6,428	3,863	...	1,008	966	...	...	...	1,974	+ 1,899
Newport (Mon.)	10,254	4,009	10,364	7,044	31,671	6,879	808	5,817	4,197	...	...	...	10,014	− 2,327
Nottingham	43,601	15,142	18,684	30,847	108,274	58,886	...	14,349	19,762	...	...	...	34,111	+ 24,775
Oldham	25,759	7,792	18,416	21,470	73,437	37,140	1,474	15,796	11,822	1,099	...	(g) 7,762	36,479	+ 2,135
Perth	3,182	698	418	1,252	5,550	3,720	50	1,523	1,632	3	612	...	3,770	...
Plymouth	8,031	4,161	4,322	7,905	24,419	14,629	1,257	4,793	3,932	...	4,465	...	13,130	+ 2,696
Pontypridd	5,017	1,395	5,476	3,196	15,084	6,809	1,754	(h)4,009	4,160	...	...	39	8,208	+ 355
Rawtenstall	5,415	2,133	3,445	4,113	15,106	11,430	(q) 1,612	5,947	6,113	...	...	...	12,060	+ 982
Rochdale	18,354	4,363	8,535	10,746	41,998	38,347	7,594	11,454	9,594	700	1,382	(z)9,483	32,613	+ 13,328
Rotherham	E 9,212 RT 557	2,778 273	5,711 633	8,591 369	26,292 1,832	13,966 625	...	4,918 73	3,261 ...	...	5,037 ...	...	13,216 73	+ 750 + 853
Salford	73,745	17,785	22,183	47,371	161,084	99,767	5,659	18,749	21,887	2,522	12,867	(k)27,401	83,426	+ 22,000
Southampton	19,408	5,269	10,092	12,280	47,049	19,485	9,151	7,290	7,241	565	5,000	1,422	21,518	+ 7,118
Southend-on-Sea	8,046	2,260	3,534	6,187	20,027	14,891	4,228	(h) 3,834	1,753	...	4,017	...	9,605	+ 9,514
Southport	4,428	2,140	2,662	3,263	12,493	4,821	6,362	6,513	5,017	...	1,977	628	14,135	− 2,952
South Shields	7,929	3,263	2,659	5,370	19,221	14,931	313	(h)5,488	3,438	...	...	...	8,926	+ 6,318
Staly'dge,H.,M.,D.	12,148	4,018	6,273	6,445	28,884	6,754	...	(h)7,711	7,308	...	327	532	15,878	− 9,124
Stockport	12,436	3,717	6,437	4,781	27,371	33,468	1,326	5,978	8,363	910	6,795	3,208	25,254	+ 9,540
Sunderland	18,431	4,552	4,670	11,268	38,921	29,950	252	(h) 7,228	10,366	476	7,132	...	25,202	+ 5,000
Wallasey	17,249	4,326	5,695	10,660	37,930	20,092	316	5,522	4,559	...	634	...	10,715	+ 9,693
Walsall	8,019	3,201	4,678	5,710	21,608	12,065	1,371	5,191	3,439	458	1,868	...	10,956	+ 2,480
Walthamstow	14,731	2,646	6,717	8,175	32,269	5,707	210	(h)6,085	2,698	...	...	...	8,783	− 2,866
Warrington	5,529	1,779	4,255	3,235	14,798	8,407	408	2,580	3,254	...	...	...	5,834	+ 2,981
West Ham	51,254	11,253	26,921	19,386	108,814	29,628	508	19,511	12,369	685	...	959	33,524	− 3,388
Wigan	...	...	...	...	41,318	31,465	...	13,859	12,391	...	...	3,781	...	...
Wolverhampton	12,259	4,157	7,334	6,778	30,528	24,232	(x) 1,131	7,788	5,146	100	4,915	(x)3,637	21,586	+ 3,777
Yarmouth (Gt.)	7,443	1,867	2,634	4,388	16,332	7,801	95	(h)4,094	2,740	...	...	...	6,834	+ 1,062

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast	73,836	13,642	32,519	23,887	143,884	110,492	1,363	45,900	24,541	2,023	13,000	1,628	87,092	+ 24,763
Bexley	(s) 5,465	984	1,892	920	9,261	6,107	...	2,942	2,325	...	500	...	5,767	+ 340
Birkenhead	16,099	4,011	10,380	9,371	39,861	25,706	86	(h)11,537	9,501	269	4,302	183	25,792	...
Bournemouth	22,307	6,912	9,107	13,967	52,293	43,719	723	10,733	15,371	...	...	(e) 8,017	34,121	+ 10,321
Cardiff	37,582	(c)11,176	15,351	20,184	84,293	66,333	1,732	24,138	22,801	800	6,946	...	54,685	+ 13,380
Coventry	10,112	4,289	6,952	2,765	24,118	15,035	2,950	10,379	6,163	...	1,258	...	17,800	+ 185
Glasgow	305,400	122,812	142,988	48,147	619,347	392,197	58,631	81,774	97,077	13,388	215,757	9,829	417,825	+ 33,003
Huddersfield	26,892	6,064	22,638	9,933	65,527	44,182	61	(h)11,749	10,904	1,630	...	...	24,283	+ 19,960
Hull	47,495	12,212	42,005	11,245	112,957	45,484	1,500	16,730	12,201	1,500	(u)3,118	...	33,549	+ 13,435
Leeds	109,413	36,055	39,894	28,455	213,817	197,714	7,511	42,197	49,923	5,021	41,752	4,957	143,850	+ 61,378
Leicester	54,257	10,405	21,566	23,887	110,115	54,402	3,763	23,541	12,453	2,122	7,636	2,413	48,165	+ 10,000
London	H 19,064 E 742,157	4,670 (r) 185,634	6,592 312,395	(m)22,122 220,042	52,448 1,460,228	def. 14,025 753,079	33,397	342,645	388,042	28,188	497	(l)27,104	786,476	...
N'castle-on-Tyne	64,493	18,675	25,944	19,908	129,020	109,185	3,966	30,431	39,556	3,179	...	6,796	79,962	+ 33,189
Northampton	7,254	3,080	2,489	3,563	16,386	11,763	279	3,481	4,312	323	...	(b)1,226	9,342	+ 2,700
Portsmouth	28,918	10,200	7,877	5,231	52,226	57,606	8,831	20,875	17,462	964	8,412	350	48,063	+ 18,374
Preston	10,781	4,592	6,263	2,429	24,065	19,205	...	3,933	4,891	...	3,649	1,358	13,831	+ 5,374
Reading	8,837	3,702	3,648	3,358	19,545	14,469	...	6,714	4,662	291	...	...	11,667	+ 2,802
Sheffield	113,235	22,312	43,656	28,487	207,690	154,155	3,057	35,616	40,663	3,786	30,187	213	110,465	+ 46,748
Wellington, N.Z.	56,296	7,242	21,330	16,260	101,128	49,144	2,664	19,961	4,778	...	14,068	4,702	43,509	+ 8,299

(a) Includes £4,998 loss on motor omnibuses. (b) Includes £500 loss on omnibus account. (c) Includes £1,611 insurance fund. (d) Includes reserve.
(e) Includes rents for leased lines. (f) £2,061 rent of leased lines. (g) Includes rents of lines and deficit 1912. (h) Including income tax.
(k) Includes rents of lines. (l) Including loss on horse traction. (m) Horsing expenses. (n) Transferred to motor omnibus capital account.
(p) Includes £396 horse account. (q) Aid from rates £1,500. (r) Including special charges, £5,911. (s) Including £2,128 through-running expenses.
(u) District fund widening streets. (w) Amount apportioned to leased lines. (x) Includes £306 profit on motor char-a-banc.
(z) Includes £6,469 rent of leased lines.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Appropriation of Net Surplus.			Receipts per Car Mile.		Operating Expenses per Car Mile.					Per-centage of Operating Expenses to Total Revenue.	Average Operating Expenses per Car Mile (excludi'g Power Cost).	Board of Trade Units.		
	Carried Forward.	Reserve.	Contribu-tion to Rates or Municip'l Funds.	Average Total per Car Mile.	Average Traffic per Car Mile.	Traffic.	General.	Repairs and Mainten-ance.	Power. (Price paid)	Total.			Units.	Cost per Unit.	Units used per car mile.
				d.	d.	d.	d.	d.	d.	d.	%	d.		d.	
Aberdeen ...	...	12,525	...	11·06	10·92	2·859	1·298	·822	·985	5·964	53·89	4·979	2,110,964	·81	1·21
Accrington ...	460	3,359	724	12·57	12·38	3·09	·84	·95	2·10	6·98	55·55	4·88	907,721	1·24	1·70
Ashton-u-Lyne	...	...	1,000	11·682	11·534	2·514	·911	1·100	1·703	6·228	53·31	4·525	622,183	1·25	1·346
Ayr...	...	1,175	...	10·13	9·713	2·16	1·23	·99	1·24	5·62	55	4·35	378,570	1·26	·98
Birmingham ...	...	45,000	56,352	10·62	10·492	2·929	·747	1·248	1·840	6·764	63·6	4·924	21,594,889	1·119	1·64
Blackburn ...	3,870	...	...	14·02	13·34	3·12	·90	2·61	2·31	8·94	56·84	6·63	2,030,535	1·3	1·81
Blackpool ...	...	2,667	7,664	16·93	16·71	3·64	1·17	2·12	2·12	9·05	53·50	6·95	1,400,209	1·587	1·33
Bolton	443	...	14,500	11·558	11·447	2·525	·733	1·354	1·674	6·286	54·915	4·612	4,315,448	1·1	1·52
Bradford... ...	...	...	9,000	12·021	11·314	3·366	·983	1·859	1·860	8·068	67·051	5·687	11,126,989	1	1·863
Brighton	932	...	...	11·545	11·112	3·071	·864	2·758	1·785	8·478	73·43	6·693	1,663,126	1·2	1·49
Burnley	...	5,791	8,750	13·226	13·185	3·098	·878	1·577	2·630	8·183	61·85	5·55	3,079,155	1·214	2·11
Burton-on-Trent	...	...	...	8·61	7·90	2·81	·73	1·45	1·42	6·41	78·7	4·99	515,622	1·39	1·01
Bury	...	(i) 4,572	5,000	10·22	10·04	2·214	·685	1·152	1·290	5·341	49·91	4·051	2,039,011	1·081	1·271
Chester	...	...	...	8·81	8·50	2·32	1·09	·61	1·52	5·54	63	4·02	385,132	1·33	1·11
Chesterfield ...	...	820	...	10·51	10·12	2·27	1·02	1·58	1·75	6·62	62·9	4·87	405,096	1·25	1·39
Colchester ...	...	...	...	7·98	7·627	2·096	·882	1·313	1·86	6·151	76·74	4·291	401,208	1·5	1·24
Croydon	...	7,586	3,000	8·381	8·207	2·763	·637	1·224	1·499	6·123	70·91	4·497	2,484,993	1·604	·938
Darlington ...	...	...	...	7·651	7·441	2·633	·480	1·202	1·222	5·537	72·36	4·315	466,784	1	1·222
Darwen	106	...	...	14·218	14·204	3·771	·783	2·833	2·396	9·783	64·30	7·387	...	...	...
Derby	6,059	...	...	E 9·884	9·671	3·385	·541	·985	1·694	6·605	66·8	4·911	1,357,232	1·45	1·168
				H. 5·649	5·347	8·564	...	·994	...	9·558	169·4	...	...	...	...
Doncaster ...	...	1,290	...	9·41	9·25	2·03	·54	2·18	1·65	6·40	69·1	4·75	683,651	1·25	1·32
Dundee	...	10	1,500	11·480	11·189	2·908	·989	1·257	1·803	6·957	60·6	5·154	2,451,897	1	1·803
East Ham ...	. .	...	...	10·06	9·95	3·02	1·10	2·04	1·76	7·92	78·8	6·16	2,139,401	1·125	1·55
Exeter	...	2,043	...	9·272	9·272	2·498	·650	·726	1·937	5·811	62·67	3·874	516,793	1·625	1·192
Gloucester ...	...	...	...	6·618	6·173	2·630	·644	1·255	·730	5·259	79	4·529	480,442	1	·73
Halifax	...	...	7,181	11·816	11·702	3·023	·926	1·702	2·116	7·767	65	5·65	3,900,902	1·125	1·81
Ilford	...	...	...	7·616	7·464	2·698	·689	1·171	1·218	5·776	76·4	4·558	960,866	1·07	1·098
Ilkeston	...	...	...	6·73	6·57	2·36	·58	1·63	1·49	6·06	90·25	4·57	339,920	1·042	1·4
Ipswich	268	...	...	8·408	8·110	2·900	·657	1·442	1·258	6·257	74·41	4·999	672,411	1·25	1·007
Keighley	...	...	...	9·064	8·754	2·664	·761	·890	1·595	5·910	65	4·315	254,636	1·5	1·05
Kilmarnock ...	...	...	...	7·09	6·89	2·357	·482	·646	1·317	4·802	66·3	3·487	313,550	1·25	1·06
Kirkcaldy ...	1,370	...	...	8·22	7·97	2·398	·587	·774	1·337	5·096	63·95	3·75	632,581	1	1·337
Lancaster ...	...	...	...	7·92	7·61	3·130	·664	1·221	2·269	7·284	91	5·015	228,902	1·7	1·33
Leith	2,274	...	...	9·07	8·81	2·34	·67	1·07	·88	4·96	54·67	4·08	899,191	·92	·95
Leyton	...	...	...	9·368	9·161	(c) 2·920	·871	1·543	1·714	7·048	75·092	5·374	2,911,345	1·037	1·615
Lincoln	381	...	...	10·24	10·05	2·21	·94	1·47	1·38	6·00	58·7	4·62	183,807	1·25	1·107
Liverpool ...	...	...	100,000	12·34	12·10	3·217	1·096	1·500	2·164	7·977	63·2	5·813	23,928,396	1·138	1·78
Lowestoft ...	...	...	...	8·3	8·3	2·5	·6	1·6	2·18	6·9	83·40	4·8	385,731	1·75	1·2
Maidstone ...	...	...	...	8·36	7·93	1·96	·82	1·19	1·55	5·52	69·58	3·97	365,309	1·25	1·236
Manchester ...	...	...	100,000	11·351	11·202	3·269	1·069	1·085	1·709	7·132	62·83	5·423	30,492,127	1·046	1·625
Nelson	1,889	...	...	12·29	12·23	2·89	·81	1·58	2·39	7·67	62	5·28	240,804	2	1·2
Newport (Mon.)...	...	...	...	9·557	9·310	2·542	·994	1·570	1·746	7·852	82·26	6·106	1,239,245	1·28	1·28
Nottingham ...	...	5,775	19,000	11·50	11·34	3·00	1·05	1·29	2·11	7·45	64·19	5·39	5,761,096	1·25	1·65
Oldham	...	2,135	...	12·946	12·645	3·016	·912	2·156	2·514	8·598	66·41	6·084	3,435,211	1·49	1·675
Perth	...	...	...	8·79	8·31	3·02	·66	·39	1·19	5·26	59	4·07	277,474	1·08	1·09
Plymouth ...	...	...	2,696	11·790	11·094	2·349	1·217	1·264	2·312	7·142	62·53	4·830	1,139,761	1·667	1·38
Pontypridd ...	355	...	...	12·16	11·99	2·78	·78	3·04	1·78	8·38	68·89	6·6	613,719	1·25	1·42
Rawtenstall ...	...	982	...	11·49	11·01	2·35	·92	1·49	1·78	6·54	56·69	4·76	734,781	1·38	1·33
Rochdale... ...	7,423	5,904	...	11·019	10·980	2·524	·610	1·193	1·560	5·887	52·3	4·327	2,566,554	1·005	1·553
Rotherham ...	E. ...	...	750	12·50	12·50	2·86	·86	1·77	2·67	8·16	65·31	5·49	1,499,517	1·375	1·94
	R.T 552	...	...	10·36	10·36	2·35	1·15	2·66	1·56	7·72	74·56	6·16	64,520	1·375	1·13
Salford	...	...	22,000	10·692	10·673	3·023	·729	·909	1·942	6·603	62	4·661	9,260,898	1·227	1·600
Southampton ...	7,118	...	...	10·411	10·044	3·037	·825	1·579	1·921	7·362	71	5·441	2,000,301	1·5	1·31
Southend-on-Sea	2,514	1,000	6,000	13·14	12·97	3·03	·85	1·33	2·33	7·54	57·35	5·21	848,538	1·75	1·33
Southport ...	...	...	...	9·595	9·381	2·454	1·186	1·475	1·808	6·923	72·1	5·101	513,285	1·5	1·185
South Shields ...	(d) 500	4,218	1,600	10·066	9·919	2·253	·885	·729	1·566	5·433	56·28	4·077	914,188	1·407	1·122
Stalybridge, &c.	...	...	...	7·880	7·729	2·686	·887	1·387	1·425	6·385	81·33	4·960	1,719,696	·9	1·584
Stockport ...	...	540	9,000	10·434	10·221	2·133	·638	1·103	·820	4·694	44·99	3·874	1,704,943	1·036	1·218
Sunderland ...	...	...	5,000	11·208	11·149	2·999	·741	·760	1·834	6·334	56·81	4·50	1,764,971	1·5	1·19
Wallasey ...	...	2,500	7,500	11·035	10·928	3·280	·823	1·083	2·028	7·214	65·3	5·18	1,827,115	1·4	1·45
Walsall	1,480	...	1,000	11·234	11·007	2·675	1·068	1·561	1·905	7·209	64	5·304	845,654	1·68	1·176
Walthamstow ...	...	...	...	7·92	7·76	3·07	·55	1·40	1·71	6·73	84·97	5·02	1,426,964	1·375	1·24
Warrington ...	1,481	...	1,500	12·398	12·237	2·954	·950	2·273	1·728	7·906	64·611	6·177	517,587	1·50	1·152
West Ham ...	...	...	...	9·43	9·329	3·554	·761	1·823	1·313	7·451	78	6·038	6,103,884	·75	1·72
Wigan	...	...	...	12·05	11·80	...	...	..	...	6·84	56·77	5·03	2,132,384	...	1·471
Wolverhampton ...	...	...	3,777	11·250	11·086	2·518	·854	1·507	1·393	6·272	55·75	4·879	1,620,970	1	1·388
Yarmouth (Gt.)...	1,062	...	...	8·605	8·425	2·655	·666	·938	1·564	5·823	67·95	4·259	655,315	1·60	·974

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

									*					Works Cost.	
Belfast	...	...	24,763	10·27	10·12	2·98	·55	1·31	·96	5·80	56·33	4·83	9,733,420	·589	1·40
Bexley	40	..	...	12·8	12·63	3·04	·89	1·75	·87	6·55	60·3	5·68	350,103	·63	1·37
Birkenhead ...	...	...	...	12·075	11·89	3·128	·779	2·016	1·141	7·064	58·49	5·923	2,490,713	·565	2·016
Bournemouth ...	...	10,321	...	12·24	12·20	2·85	·88	1·16	(b) 1·78	6·67	54·46	4·83	2,917,309	·583	1·55
Cardiff	3,980	...	9,400	12·014	11·83	3·449	1·026	1·409	·679	6·563	56	5·884	4,015,405	·438	1·54
Coventry ...	185	...	...	9·451	9·414	2·441	1·035	1·678	·668	5·822	61·6	5·154	1,533,212	·450	1·44
Glasgow	...	...	33,003	10·404	10·364	3·141	1·263	1·471	·495	6·370	57·88	5·875	32,280,346	·358	1·38
Huddersfield ...	...	13,370	6,590	11·04	10·73	2·70	·61	2·28	1·00	6·59	59·73	5·59	5,413,488	·42	2·27
Hull	...	1,435	12,000	9·42	9·33	2·82	·68	2·46	·67	6·63	71·04	5·96	4,855,082	·67	1·31
Leeds	...	...	61,375	11·229	11·120	2·985	·984	1·089	·776	5·834	51·95	5·058	16,461,894	·440	1·807
Leicester... ...	...	...	10,000	9·801	8·785	3·232	·620	1·285	1·423	6·560	66	5·137	7,141,333	·411	1·77
London	...	...	...	H. 8·73	8·53	4·32	1·07	1·50	5·02	11·91	136·50	11·91	...	...	...
				E.10·04	9·73	3·36	·84	1·42	1·00	6·62	65·97	5·62	138,714,732	·619	2·62
N'castle-on-Tyne	...	21,189	12,000	11·958	11·451	3·238	·937	1·302	1·000	6·477	52·57	5·477	9,426,563	·394	1·972
Northampton ...	500	1,200	1,000	10·55	10·21	2·72	1·15	·93	1·34	6·14	58	4·80	934,909	·91	1·46
Portsmouth ...	11,374	(f) 3,000	4,000	12·229	12·035	3·220	1·136	·877	·582	5·815	47·55	5·233	2,599,210	·543	1·206
Preston	...	5,374	...	10·698	10·50	2·665	1·135	1·550	·600	5·96	55·63	5·35	1,516,545	·384	1·309
Reading	...	2,802	...	8·920	8·650	2·319	·970	·957	·880	5·126	57	4·246	1,033,313	·78	·99
Sheffield	...	7,032	37,716	10·760	10·665	3·367	·664	1·298	·847	6·176	57·389	5·329	16,500,208	673	1·837
Wellington, N.Z.	8,299	...	...	15·654	15·568	5·864	·755	2·222	1·694	10·535	67·3	8·841	4,921,406	·80	2·13

* The figures given under "Power" in Table II. include actual works costs only. H—Horse lines. E—Electric trolley system. (b) Including ·88d. per car mile current supplied by Bournemouth and Poole Supply Company. (c) Horse account ·053d. (d) Accident, insurance, and compensation fund. (f) Insurance fund. (i) Including Insurance.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Population Served.	Traffic Records. Car Mileage.	Passengers Carried.	Passengers Carried per Car Mile.	Average Fare per Passenger.	Average Journeys per Head of Populat'n per Annum.	Average Car Miles per Day per Car.	Traffic Revenue per Mile of Single Track.	Average Traffic Revenue per Annum per Head of Populat'n Served.	Operating Expenses per Passenger.	Average Distance of 1d. Fare.	Average Fare Charged per Mile.	Average Speed per Hour.	Average Total Car Hours per Day.	Average Number of Cars in Use Daily.	Number of Cars in Stock.
					d			£		*d.*	*Miles.*	*d.*	*Miles.*			
Aberdeen ...	165,000	1,738,966	19,990,711	11·49	·95	121·15	105·8	2,930	9/6	·519	1·69	·6	7·5	655	45	77
Accrington...	70,000	531,356	4,577,019	8·6	1·43	65·3	105	2,572	7/10	·81	1·07	·929	7·5	242	17	27
Ashton-u-L.	50,000	462,060	4,928,282	10·666	1·081	98·565	105	2,712	8/10	·584	1·223	·81	8	190	12	23
Ayr	33,000	385,986	3,880,850	10·05	·96	117	106	2,079	9/6	·558	1·25	·75	8	140	10	20
Birmingham	est.850,000	13,134,642	134,467,166	10·23	1·025	158	81·06	5,298	13/6	·66	2·34	·366	7·5	5,063	485	511
Blackburn ...	200,000	1,141,161	11,721,367	10·88	1·27	58·61	105	2,564	6/4	·87	1·25	·76	7·50	434	31	61
Blackpool ...	67,500	1,050,115	12,452,820	12	1·41	184·48	89·6	4,321	21/8	·765	...	...	8	...	32	72
Bolton ...	221,000	2,831,003	30,287,673	10·69	1·065	137·04	121·66	2,875	12/3	·588	1·468	·627	7·25	1,030	60	106
Bradford ...	354,000	5,971,561	62,005,976	10·383	1·086	175	113	2,703	15/11	·776	1·63	·804	7·3	2,232	144	242
Brighton ...	132,265	1,118,309	11,312,855	10	1·09	85·55	82·83	3,012	7/11	·84	1·27	·788	6·41	544	34	50
Burnley ...	175,000	1,449,647	15,949,359	11	1·18	91	95	3,620	9/1	·744	1·25	·83	7	760	40	57
Burton ...	48,000	437,106	3,188,655	7·30	1·082	66	...	1,684	5/10	·928	1·505	·58	7·5	...	...	20
Bury	128,202	1,599,872	15,132,553	9	1·07	118·03	102·33	1,957	10·6	·535	1·24	·85	8·56	506·64	42·71	54
Chester ...	39,028	346,645	3,067,815	8·85	·96	78·6	95	1,906	6/4	·626	1·27	·8	7	150·60	10·04	18
Chesterfield	38,000	289,745	2,631,398	9·08	1·1	69	122	2,407	6/8	·728	1·38	·75	7·33	126	7	14
Colchester ...	44,160	323,524	1,871,896	5·79	1·32	42·39	89·3	1,295	4/8	1·06	·85	1·09	6·81	157·92	9·87	18
Croydon ...	170,451	2,687,824	20,504,143	7·74	1·06	120·29	125	4,734	10·7	·775	2·15	·50	7·92	915·82	58	75
Darlington...	58,000	381,920	3,791,835	9·9	·75	65·38	95·1	1,345	4/1	·557	1·219	·45	6·66	151·25	11	16
Darwen ...	40,611	252,710	2,755,011	10·91	1·24	67·83	...	1,989	7/–	·864	...	...	...	...	...	...
Derby ...	124,000	E 1,161,884	10,857,834	9·345	1·035	87·56	...	2,122	7/7	·707	1·44	·75	6·375	...	...	50
		H. 17,674	98,230	5·558	·962				...	1·36	1	1	..	...	...	3
Doncaster ...	52,000	516,540	5,072,172	9·81	·952	97·54	103	1,591	7/8	·652	1·25	·76	7·5	218	16	25
Dundee ...	165,000	1,359,821	17,734,162	13·04	·857	107	...	2,305	7/8	·533	2	·50	7·3	...	...	68
East Ham ...	130,000	1,375,433	17,775,698	12·92	·77	132	...	5,101	8/9	·61	1·80	·65	...	...	...	45
Exeter ...	48,660	433,507	4,110,513	9·48	·98	84·48	...	2,392	6/11	·612	1	1	6	...	16	20
Gloucester ...	53,972	628,946	4,200,432	6·7	·92	77	90·75	1,078	6/–	·78	1·5	·65	6·76	260·3	19	30
Halifax ...	176,000	2,182,391	19,456,923	9·04	1·27	110	79·5	1,912	11/11	·86	1·35	·84	6·8	814	74	95
Ilford ...	82,000	813,517	7,578,813	8·79	·831	92·42	...	2,312	5/1	·64	1·343	·69	8	...	...	26
Ilkeston ...	32,000	238,645	1,732,846	7·25	·9	54	117	1,713	6/1	·836	3·2	·35	7·5	108	7·5	13
Ipswich ...	75,300	668,025	5,554,585	8·31	·975	73·76	65·5	1,518	6/–	·75	1·53	·693	6·17	234·19	20·78	36
Keighley ...	43,000	242,500	3,099,272	12·8	·68	72·08	55·35	1,447	4/1	·462	2·22	·45	6·87	126	7	12
Kilmarnock ...	36,000	297,557	2,317,709	7·78	·879	64·38	90·05	1,537	4/8	·616	1·13	·86	7·22	112·58	9·05	14
Kirkcaldy ...	39,600	473,089	5,237,947	11·07	·719	132·27	59	1,786	7/11	·46	1·522	·64	7·5	195	15	22
Lancaster ...	41,414	171,475	1,461,104	8·52	·893	35	75	1,132	2/8	·854	1·71	·5	8	88·2	6·3	12
Leith ...	110,400	944,329	9,706,611	10·28	·87	87·92	125	1,926	6/3	·482	1·32	·72	8·3	311	20·66	37
Leyton ...	124,735	1,602,647	17,476,453	9·69	·945	140	112	3,719	11/–	·727	...	...	8	...	...	60
Lincoln ...	20,000	160,446	1,733,259	10·8	·92	86·66	64·08	2,264	6/8	·556	1·75	·428	7	90	5	8
Liverpool ...	839,000	13,442,605	144,085,927	10·72	1·129	172	77	5,695	16/2	·744	2·514	·39	7·5	4,920	480	595
Lowestoft ...	35,000	303,897	2,462,188	8	1·05	70·35	...	2,646	6/2	·878	univ'rs'l penny fare		...	...	..	19
Maidstone ...	25,000	295,438	2,224,200	7·528	1·053	88·968	81	1,387	7/1	·73	1	1	6·7	128	12	19
Manchester	950,000	18,768,259	187,675,183	10	1·12	198	95·8	4,990	17/5	·713	2·368	·422	7·25	...	537	629
Nelson ...	45,000	200,996	2,776,785	13·82	·88	61·71	94·09	2,650	4/4	·555	1	1	5·50	108	6	11
Newport ...	87,626	968,067	9,251,181	9·56	·973	105·6	...	2,617	8/7	·821	1·75	...	...	...	37	44
Nottingham	260,000	3,485,789	38,484,032	11·04	1·02	148	92·08	4,514	12/8	·67	1·68	·65	6·86	...	104	135
Oldham ...	180,000	2,049,916	21,435,727	10·457	1·19	119·087	109·5	2,962	12/–	·822	1·115	·884	6·84	820	51·25	92
Perth... ...	35,900	252,940	1,813,228	7·16	1·15	50·5	96·25	1,298	4/7	·73	...	...	6·25	120	8	12
Plymouth ...	112,000	820,406	8,839,974	10·77	1·029	78·92	...	2,528	6/9	·663	...	...	...	...	...	42
Pontypridd ...	40,000	433,006	5,047,168	11·68	1·02	126	81·2	2,509	10/9	·71	1·25	·51	6·5	221	17	26
Rawtenstall	50,000	553,813	4,943,775	8·93	1·23	98·72	126	1,600	10/2	·73	1·12	·88	9	198	12	24
Rochdale ...	130,000	1,749,967	13,740,152	7·91	1·38	105·7	114·90	2,008	12/4	·734	1·07	·90	7·66	645	43	69
Rotherham ...	64,000	E 772,610	8,774,539	11·35	1·104	137·12	...	3,352	12/7	·719	...	...	...	...	...	...
	...	H 56,887	191,088	3·36	3·08	...	...	...	...	2·3	...	...	...	...	...	...
Salford ...	350,000	5,854,830	50,113,120	8·559	1·243	143	111	3,425	14/10	·77	1·85	·85	7·853	2,075·18	144	200
Southampt'n	122,200	1,533,638	12,475,793	8·134	1·235	102	...	3,482	10/6	·90	...	...	...	...	...	70
Southend ...	78,000	637,366	7,581,104	11·89	1·09	97·2	87	4,708	8/10	·634	1·41	·76	6·5	357	21	31
Southport ...	31,312	433,069	4,401,336	10·63	·923	140·5	103	1,574	10/10	·68	1·6	·62	6·65	217·5	13·5	26
So'th Shields	110,513	814,212	8,456,688	10·386	·942	76·5	129·2	3,332	6/1	·545	1·825	·54	7·61	282	16	35
Stalybridge	92,935	1,088,545	8,896,836	8·123	·943	95·7	...	1,280	7/6	·779	1·275	·784	6·8	...	...	60
Stockport ...	120,000	1,399,314	10,665,098	7·6	1·341	88·8	76·6	2,158	9/11·3	·615	1·25	·72	7·5	465	38	50
Sunderland ...	170,000	1,474,637	16,972,537	11·5	·968	99·8	79·3	3,366	8/1	·550	1·34	·68	7	672	42	70
Wallasey ...	83,000	1,261,855	12,352,000	9·78	1·11	148·94	98·7	2,893	13/10	·99	1·89	·54	7	...	...	61
Walsall ...	100,000	719,372	6,121,381	8·509	1·293	61	86	1,885	6/7	·847	1·24	·79	7	345	23	39
Walth'mst'w	128,000	1,151,029	11,807,549	10·258	·756	91·89	93	2,968	5/11	·655	1·15	·89	7·2	408	36	38
Warrington	86,000	619,206	6,064,139	13·5	·906	70·513	102·533	2,372	5/4	·584	1·246	·803	6·408	192·048	12·003	21
West Ham ...	294,200	3,544,292	40,200,347	11·34	·822	136	98	4,592	9/4	·65	1·80	·56	7·66	1,262·25	99	118
Wigan ...	200,000	1,449,188	13,018,833	8·98	1·314	65·1	105·5	2,309	7/2	·761	1·15	...	7·4	...	42	67
Wolverh'ton	135,000	1,163,239	11,913,122	10·198	1·08	88·25	87	2,510	8/–	·615	1·18	·879	6·85	622·2	36·6	49
Yarmouth ...	55,800	673,027	4,514,871	6·7	1·256	80·91	73·7	1,687	C/6	·868	1·25	·76	7	375	25	35

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast ...	385,492	5,946,659	58,437,942	9·82	1·07	151	128	2,539	13/–	·592	1·96	·43	8·75	2,256	141	282
Bexley ...	16,000	262,658	2,130,189	8·11	1·56	133	...	2,360	18/11	·95	1·37	·62	7·5	...	8	16
Birkenhead	130,832	1,235,277	13,622,361	11·02	1·077	104·12	68·64	2,540	9/4	·702	1·39	·66	6·61	511·73	49·30	59
Bournem'uth	120,000	1,882,054	15,750,576	8·36	1·45	131	95	3,214	16/–	·796	1·19	·87	6·80	1,140	60	81
Cardiff ...	182,729	2,614,901	28,365,277	10·84	1·09	155	98·25	4,062	14/1	·713	1·44	·736	7·5	1,120	70	130
Coventry ...	135,000	994,207	7,639,065	7·7	1·23	57	68	2,516	5 9	·757	1·18	·866	6·4	424	35	41
Glasgow	1,150,000	23,335,008	311,480,086	13·348	·776	270·85	105·49	5,139	17/6	·477	2·31	·44	8·13	8,484·59	606·04	843
Huddersfield	160,000	(a) 2,383,858	21,595,569	9·09	1·18	144	120	3,675	13/4	·728	1·39	·70	7·48	868·32	54·27	86
Hull	287,032	4,040,739	42,997,226	10·64	·877	149·80	127·10	5,141	10/7	·631	2·75	...	9	1,393·6	87·10	160
Leeds ...	500,000	8,795,468	89,668,185	10·2	1·088	179	113·35	3,594	16/3	(b) ·937	1·95	·539	7·48	3,190	213	232
Leicester ...	230,970	4,028,542	37,073,717	9·202	·954	161	...	3,985	12/9	·712	2·18	·984	8	...	...	150
London ...	...	H 1,056,481	11,550,504	10·93	·78	...	77·12	2,365	...	1·09	...	...	5·85	500·84	38	74
		E52,886,623	501,102,149	9·48	1·03	...	117·15	7,867	...	·69	...	...	8·52	16,427·36	1,237	1,661
Newcastle ...	300,000	4,780,662	52,204,974	10·92	1·082	174	...	3,738	15/2	·593	1·58	·633	7	...	...	192
Northampt'n	90,793	640,158	6,727,190	10·51	·97	76·53	...	2,974	6/–	·58	1·34	·7	6·91	...	...	26
Portsmouth	241,256	2,155,508	24,520,647	11·37	1·052	101·63	84	3,505	9/–	·511	1·66	·62	7	1,072	72	100
Preston ...	120,000	970,719	9,567,366	9·85	1·06	79·73	132	2,498	7·2	·603	1·01	·95	7·36	...	...	33
Reading ...	76,000	915,180	8,251,274	9·01	·97	108	97	2,505	8 8	·57	1·89	·68	7	352	26	36
Sheffield ...	466,408	8,071,188	96,350,242	11·935	·893	206·535	103·32	4,606	15 5	·517	2·62	·386	7·372	3,103·27	214·019	279
Wellington...	68,000	2,303,913	23,858,412	11·08	1·40	350	90	4,706	43/11	·94	1·112	·88	7·86	803	70	89

E—Electric trolley system. H—Horse lines. (a) Including 9,417 miles coal haulage. (b) Total expenses per passenger.

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FINANCIAL REPORTS AND MEETINGS.

South Staffordshire Tramways Company.—For 1913 the directors recommend a dividend of 3½ per cent. on preference shares, carrying £603 forward.

Brazilian Traction and Light Company.—A dividend of 1½ per cent. for three months to March 31 on 6 per cent. cumulative preference shares has been declared.

British Insulated and Helsby Cables.—A dividend of 9s. per share has been declared, £90,500 being placed to reserve, and £98,000 carried forward. The dividend a year ago was 6s. per share.

Hadfield's Steel Foundry Company.—The directors recommend a final dividend of 2s. and a bonus of 1s. per share on ordinary shares, making 4s. (20 per cent.), free of income tax, for the year.

Great Orme Tramways Company.—The receipts for 1913 amounted to £2,898, and the profits £1,342, while £856 was brought forward. After providing for interest charges the surplus is £1,980. The directors propose to appropriate £1,000 for depreciation, and to carry forward £980.

Waste Heat and Gas Electrical Generating Stations Company.—The net profits for the past year were £38,245, and £8,965 was brought forward. A final dividend of 5½ per cent. is proposed, making 8 per cent. for the 12 months, adding £9,500 to the reserve, and carrying forward £12,110.

Wemyss and District Tramway Company.—The accounts for the past year show a profit of £4,351. The directors propose to write off £500 to betterment, to add £1,306 to depreciation reserve fund, to pay a dividend of 7½ per cent. on the ordinary shares, and to carry forward £1,072. The cumulative preference shares for the first time receive 7½ per cent.

W. T. Henley's Telegraph Works.—The profits for 1913 were £112,509. It is proposed to add to the reserve for depreciation of securities £5,284, and to general reserve £15,000. A final dividend on the ordinary shares of 10 per cent., free of tax, is proposed, making 15 per cent. for the year. A bonus of 5s. per share, free of tax, is also recommended, leaving £59,065 to be carried forward.

Chatham and District Light Railways.—For the half-year to December 31 the net profit was £11,379. Of this sum £5,500 is transferred to reserve for depreciation, and the directors recommend a dividend at the rate of 5 per cent. per annum for the half-year on preference shares, and at the rate of 4 per cent. per annum for the half-year on ordinary shares, carrying forward £819.

Stewarts and Lloyds.—After establishing a fund of £2,000 for the benefit of the employees and setting aside £100,000 for depreciation and £50,000 to reserve, the directors recommend a dividend of 2s. per share on deferred shares, with a bonus of 6d. per share, leaving £95,000 to be carried forward. A year ago the dividend was 1s. 6d. per share on deferred shares, with £100,000 for depreciation, £50,000 for reserve, and £90,000 carried forward.

Mumbles Railway and Pier.—The report for the half-year ended December 31 showed that after payment of the dividends due to the Swansea and Mumbles Railway, Limited, under the agreement dated April 18, 1898, there was a balance available for dividends of £2,927, and the directors recommend dividends at the rate of 4 per cent. per annum on £24,900 preference shares and 7 per cent. per annum on £47,183 ordinary shares for the half-year, and to carry forward £903 to the next account. Lord Glantawe, the chairman, presided at the annual meeting on February 7, when the report was adopted.

Record Year for Torquay Tramways Company.—Mr. L. B. Schlesinger, who presided at the annual meeting of the Torquay Tramways Company, observed that the results for 1913 were in every way satisfactory. The directors recommended now a dividend of 5 per cent. on the ordinary shares, and the placing of the substantial amount of £2,500 to reserve and renewals. A bonus of £196 was granted to the staff. The use of car meters had reduced the current consumption, and had also a desirable effect on the repairs and maintenance of the cars, due to more careful driving, and to the fact that defects were promptly detected.

Leicester Corporation Tramways.—The report and accounts for 1913 were presented to the Council on February 24. The net revenue for the year amounted to £32,501, of which £12,453 has been contributed to the sinking fund, and £6,059 expended during the year on the Humberstone Road widening, motor lorry, new canopy cars, arrears of income tax, etc. It is recommended that the balance of revenue on December 31 last (£13,988) shall be appropriated as follows: New canopy cars, £339; 10 canopy tops for cars, £707; Leadenhall Street property, £999; new engine bed, £400; power supply purposes, £1,552; relief of borough rates, £10,000.

Walsall Corporation Tramways.—The statement of accounts for 1913 shows that the number of passengers carried was 6,121,381, and the revenue was £33,673, being at the rate of 11·234d. per car-mile run. The working expenses were at the rate of 7·209d. per car-mile, and amounted to £21,607. After meeting interest on loans and sinking fund there remained £4,348 for appropriation. Of this, £368 is devoted to cost of alterations and extensions at the depot; £1,500 to alterations and extensions at the central tramway offices, and £1,000 contributed in aid of the rates for 1913. Of the net balance of £1,480, it is proposed to contribute a further £1,000 to the rates, and to utilise the remaining £480 in providing new brakes for cars. The reserve fund amounts to £33,873.

Tyneside Tramways and Tramroads Company.—The half-yearly meeting was held at Newcastle on February 10, Dr. J. T. Merz presiding. The chairman said the profits of the past year were £4,349, or £1,681 more than in the previous year. The report was adopted, and the chairman and Lord Armstrong (directors) were re-elected. Dividends were declared as appended: On the preference shares at the rate of 5 per cent. per annum, £601; on the ordinary shares at the rate of 2½ per cent. per annum, being at the same rate as paid for the corresponding half-year. To the credit of reserve for renewals, depreciation, and other contingencies £1,400 was placed, increasing the fund to £16,086, leaving to be carried forward £387. The dividend paid on ordinary shares for the whole year is an increase of ¼ per cent.

Swansea and Mumbles Railway.—The directors' report for the year ended December 31 last stated that the following interim dividends had been paid, viz.: 4½ per cent. per annum on £75,500 preference shares and 8¾ per cent. per annum on £40,000 ordinary shares for the half-year ended June 30, 1913. The directors recommended the payment at the rate of 4½ per cent. per annum on £75,500 preference shares and 8¾ per cent. per annum on the reduced capital of £40,000 ordinary shares for the half-year ended December 31, which is equal to 7 per cent. per annum on the original capital. At the ordinary meeting on February 7, Lord Glantawe moved the adoption of the report, and announced that next year the dividend would be half per cent. more. He was glad to note that the lessees were beginning to get some return for their expenditure and courage in the undertaking.

The Year's Working at Hull.—The Mayor (Councillor Hargreaves), presiding at a meeting of the Tramways Committee on February 17, said the year's working showed a net surplus of £12,385. The previous year it was £13,485. The committee had had to pay £11,503 (£4,182 more than in the previous year) in rent, rates, and taxes, the increase being due to the decision of the House of Lords in the Tottenham rating appeal. The previous year the committee voted £12,000 towards the relief of the rates; this year he suggested that £7,000 should be so allocated, and the remaining £5,000 set aside as a reserve fund which could be used for providing shelter on the platforms of the 160 cars for the protection of the drivers. Alderman Gillett said he thought that £5,000 was far too much to set on one side for that purpose. At Birmingham the cars had a very simple shelter arrangement.

Lanarkshire Tramways.—At the annual meeting of this company the chairman stated that the capital expenditure had been heavy; amounting to about £11,000, mainly expended on 12 additional tramway cars and two motor omnibuses. There was a further expenditure of £2,000 on the extension of the car sheds, but this work was not completed when the accounts were made up at December 31 last. The traffic receipts showed an increase for the first half of the year of £6,314 and for the second half an increase of £6,393, a total of £12,707. The balance of profit available allows for payment of a dividend of 6½ per cent. per annum for the half-year, making 6¼ per cent. for the full year, as compared with 5¾ per cent. for 1912, and after reserving £522 for additional remuneration due to the directors there is £1,991 to carry forward.—The extension of the Lanarkshire tramways, Uddingston Cross to Bellshill Cross, by Fallside and Bothwell Park, was opened on February 12. The new line serves an extensive population.

Mansfield Tramways Company.—Mr. A. R. Holland, the chairman, moved the adoption of the report at the annual meeting held at Mansfield on February 16. He said that after spending on repair and maintenance account over £2,500, or a sum in excess of what had ever been spent before, and after placing £1,400 to the depreciation fund, they had decided, as the year had been a good one, that it would be wise to place a sum of £1,000 to the renewals account. After recommending a dividend of 5½ per cent. on the ordinary shares, or ½ per cent. more than on the last occasion, they were able to carry forward £1,400 to the new account. This had been the busiest year the company had ever had, and developments were taking place in several directions. For some time past the directors had had under consideration whether the time was not getting ripe for them to endeavour to give increased facilities of locomotion between some of these fast developing areas and the town of Mansfield. A vote of thanks was accorded to Mr. C. R. Walker and his staff, the chairman describing Mr. Walker as an excellent manager.

Lancashire United Tramways and Goods Carriage.—The Hon. Arthur Stanley, M.P., presiding at a meeting in London of the Lancashire United Tramways on February 27, said that the working of the combined undertaking had produced a profit of £27,653, which was an increase of £8,187 over 1912. The traffic earnings per mile showed a satisfactory increase from 8·21d. to 9·04d. Although they had earned £27,653 they did not think it would be advisable to make any payment of interest on the second mortgage debenture stock, and therefore they had only transferred from the operating companies

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TRAMWAY AND OMNIBUS SHARE LIST.

Specially Compiled for "The Tramway and Railway World."

Amount Ranking for Dividend.	Shares.	Name.	Div'd. Prev. Half-year.	Div'd. Last Half-year.	Quotations, Mar. 4.	Movement Since Feb. 6. Rise.	Movement Since Feb. 6. Fall.	Latest Business Done. Price.	Latest Business Done. Date.	Yield on Buying Price. £ s. d.	Dividend Due. (Final in Italics.)	Quotations, Jan., 1908, to Mar. 4, 1914. Highest	Quotations, Jan., 1908, to Mar. 4, 1914. Lowest
640,000	5	Anglo-Argentine Tramways 5½% Cum. 1st Pref.	2/9	2/9	4⅛–5	...	—	4⅛	Mar. 4	5 8 9	Jan.. Dec.	5⅛	4½
500,000	5	Do. do. 5½% Cum. 2nd Pref.	2·9	2·9	4⅛–4⅜	...	—	86/10	Feb. 21	6 1 3	June, *Dec.*	5½	4⅞
1,500,000£	...	Do. do. 5% Deb. Stock Red.	5%	5%	96½–98⅛	...	...	97⅛	Mar. 4	5 1 6	June, Dec.	105½	95½
325,532£	Stk.	Auckland Elec. Trys. Co. 5% Mort. Deb. ...	5%	5%	103—106	...	...	104	Mar. 2	4 15 3	Jan., July.	107	99½
75,000	1	Bath Electric Tramways 5% Cum. Pref. ...	6d.	6d.	⅝–1¼	...	—	10/6	Mar. 3	7 5 6	*Jan.* & July	⅝	⅝
334,696£	Stk.	Birmingham Dist. Pow. & Tract. 4½% 1st Deb....	4½%	4½%	85—87	...	—	86	Feb. 12	5 4 0	Jan., July.	96	77
15,000	10	Blackpool and Fleetwood Tramways	4/-	13/-	14 -15xd	...	—	14½	Jan. 5	5 13 6	Feb., Aug.	16	12
60,000	10	Bombay Elec. Supply & Trys. Co. 6% Cum. Pref.	6/-	6/-	10¾—11½	...	...	11⅛	Feb. 23	5 7 3	Feb., Aug.	12	7⅞
1,003,614	$100	Brazil Traction...	6	6	89—91	...	— 2	89½	Mar. 4	6 15 0	Fb.My.Ag.Nv.	105½	83½
75,000	5	Brisbane Elec. Tramways Investment Co. Ord.	4/-	4/-	7⅜—8⅜	...	..	7⅛	Feb. 5	4 18 6	*May*, Oct.	9⅜	5⅛
75,000	5	Do. do. do. 5% Cum. Pref.	2/6	2/6	4⅞—5⅜	...	...	5⅜	Feb. 17	4 13 0	*May*, Nov.	5⅜	4⅜
50,000	10	Bristol Tramways and Carriage Co.	4	5	7—7½	+ 1½	...	5½	Oct. 29	6 4 3	*Feb.*, Aug.	14½	5
50,000	10	Do. do. do. 4% Cum. Pref.	4	4	7—7½	+ ½	...	6½	Nov. 21	5 6 9	Jan., July.	9½	6½
800,000£	Stk.	British Columbia Electric Railway Def. Ord. ..	8%	8%	119—123	...	...	122½	Feb. 28	6 10 3	May, Nov.	156	114
800,000£	Stk	Do. do. Pref. Ord.	6%	6%	106—110	...	— 1	107½	Mar. 4	5 9 3	Feb., Aug.	132⅛	103
800,000£	Stk	Do. do. 5% Cum. Perp. Pref.	5%	5%	103—106	+ ½	...	105½	Mar. 4	4 14 6	Jan., July.	114	98½
1,070,097£	Stk.	British Electric Traction Prefd. Ord.	...	...	15½—17½	...	— ½	15½	Mar. 4	...	Apr., *Oct.*	18	8
403,503£	Stk.	Do. do. 6% Cum. Pref. ...	6%	6%	90—93	...	— 2	90½	Mar. 4	6 9 0	Feb., *Aug.*	95¼	73
1,464,245£	Stk.	Do. do. 5% Perp. Deb. ...	5%	5%	94—97	+ 1	...	96	Mar. 2	5 5 6	April, Oct.	101	82½
439,796£	Stk.	Do. do. 4½% 2nd Deb. Red. ...	4½%	4½%	79—82	...	...	81	Mar. 2	5 11 3	May, Nov.	84	58
246,625£	Stk.	Buenos Aires Port & City Trys. 6% 1st Mt. Deb.	6%	6%	73—78	...	...	76	Feb. 23	7 14 0	Feb., Aug.	103	61
623,270£	Stk.	Buenos Ayres Lacroze Trys. Stg. 5% 1st Mt. Deb.	5%	5%	100—102	...	...	101	Mar. 2	4 18 0	Mar., Sept.	103	89
137,610	5	Calcutta Tramways Ord.	5/-	2/6	6½—6¾	+ ¼	...	6½	Mar. 4	5 15 6	*Apr.*, Oct.	7¼	4
47,295	5	Do. 5% Cum. Pref.	2/6	2/6	5—5½	...	...	5⅜	Feb. 28	4 15 3	Jan., July	5⅜	4⅜
491,222	1	Cape Electric Tramways	1/-	for '12	⅞–1⅛	...	...	13/6	Feb 23	6 19 3	Feb., *Nov.*	1⅛	⅝
15,000	10	Carthagena and Herrerias Steam Tramways ...	4/-	May, '13	3—3⅜	...	...	62/6	Mar. 3	5 6 9	April.	7	3
248,000	5	City of Buenos Ayres Tramways (1904) ...	2/6	2/6	5½–5½xd	...	...	5⅜	Mar. 3	4 11 0	Fe My.Au No	6	5⅛
120,000£	Stk.	Colombo Elec. Trys. & Ltg. 5% 1st Mt. Deb. ...	5%	5%	89—93	...	...	90	Jan. 7	5 8 9	May, Nov.	101	87
11,500	10	Cork Electric Tramways and Lighting Co. ...	...	6/- ann.	4½–4⅝	...	...	4⅛	Dec. 23	6 6 6	*Mar.*	10	4½
12,327	10	Do. do. do. 5% Cum Pref.	5/-	5/-	6⅝–7	...	...	6⅛	Jan. 29	7 13 0	Jan., July	10½	6⅛
3,000	10	Dublin and Lucan Elec. Railway 5% Cum. Pref.	5/-	5/-	8½–8⅝	...	...	9	Aug. 25/10	5 14 3	Sep.15, Mar.15	9½	6
60,000	10	Dublin United Tramways Co. (1896), Ltd., Ord.	6/-	5/-	10⅜—11⅛	...	...	11⅛	Mar. 4	4 17 9	Feb., Aug.	14	10⅛
60,000	10	Do. do. do. 6% Cum. Pref.	6/-	6/-	12½—12⅝	...	...	12⅜	Mar. 2	4 14 3	*Feb.*, Aug.	14	11⅛
13,500	10	Gateshead & District Trys. Co. Ord.	9/-	5/-	8⅞–9¼	...	...	9	Jan. 7	7 11 9	*Mar.*, Sept.	9⅜	7⅛
268,235	10/-	Hastings and District Elec. Trys Ord.	...	...	⅞–1	...	...	1/9	Jan. 5/12	...	...	1⅜	⅞
80,000	1	Do. do. 6% Cum. Pref. ...	6%	6%	1⅛–1⅜	...	...	12/6	June 6	8 14 6	...	⅝	⅝
125,000£	Stk.	Do. do. 4½% Deb. Stk. Red.	4½	4½	67—72	...	...	67½	Feb 10	6 8 9	April, Oct.	100	67½
$9,634,000	$1,000	Havana Elec. Rly. Co. Con. Mort. 5%	5%	5%	93½–97½	...	...	96½	Dec. 23	5 7 6	Feb., Aug.	105	80
195,000£	100	Hong Kong Tramways Co. 5% Mt. Deb. ...	5%	5%	86—90	...	...	87	Feb. 9	5 12 6	May, Nov.	92	75½
20,000	10	Imperial Tramways Ord.	Nil	4% year	3—3½	...	— ½	3	Mar. 4	12 6 3	Feb., Aug.	9⅜	2½
20,000	10	Do. 6% Cum. Pref.	...	6% year	6½–6⅞	...	...	6⅞	Ju. 28/09	9 4 9	Jan., July.	9½	2⅞
30,000	5	Isle of Thanet Elec.Try.& Ltg. Co.5% Cum.Pref.	2/6	Dec. '12	2—2½	+ ¼	...	46/3	Nov. 30/12	6 0 0	*Mar.*, Sept.	3	⅜
250,000	1	Kalgoorlie Electric Tramways	...	...	0—⅛	...	...	1/-	Jan. 15/12	...	*May*	⅜	0
170,000	1	La Plata Elec. Trys. Co. 6% Cum. Pref. ...	0/4·65	0/4·80	⅞—1	...	...	17/-	Oct. 14	...	*April*, Oct.	1⅛	½
30,800	10	Lanarkshire Tramways	6/-	6/-	9⅜–10¼	...	— ¼	10⅛	Feb. 18	6 2 0	Feb., Aug.	10⅝	9⅜
250,000£	Stk.	Lancashire United Trys. 5% Prior Lien Deb....	5%	5%	85—87	+ 4	...	78¾	Oct. 11	5 16 3	Jan., July.	95	76
634,026	1	Lisbon Electric Tramways Ord.	7½d.	7½d.	1⅛–1⅜	...	...	22/3	Aug. 25	4 11 6	*July.*	1⅜	⅜
425,553	1	Do. do. 6% Cum. Pref ...	7½d.	7½d.	1—1⅛	...	...	22/6	Feb. 15	5 6 9	Jan., July.	1½	⅞
1,666,673	1	Lohdon and Suburban Traction Ord.	...	...	⅛–⅜	...	...	5/-	Feb. 28	...	...	⅜	⅛
1,316,268	1	Do. do. do. 5% Cum. Pref.	...	5	¾–⅞	...	...	13/3	Feb. 23	6 13 6	Feb., Aug.	⅞	⅜
1,000,000£	Stk.	London General Omnibus 4½% 1st Deb.	4½	4½	97½–99½	+ ½	...	98½	Mar. 3	4 11 0	Jan., July.	98¼	92½
1,000,000£	Stk.	Do. do. 5% Cum. Income ...	5	5	89—92	...	...	89½	Mar. 4	5 8 9	Feb., Aug.	95	85½
1,649,930£	Stk.	London United Tramways 4% 1st Deb. Stk. ...	4	4	63—67	...	— 1	66½	Feb. 9	6 0 6	*Jan.*, July.	82	54½
63,430£	Stk.	Madras Elec. Trys. (1904) Ltd. 5% Deb. Red. ...	5%	5%	101—103	...	...	101½	Oct. 16	4 17 3	Jan., July.	105	86
20,000	5	Do. Do. Do. 6% Cum. Pref. ...	...	...	5—5⅜	+ ⅛	...	5⅜	Jan. 7	5 11 9	Ma., Sept.	5⅜	87/6
300,000£	100	Manaos Trys. & Ltg. Co. 5% 1st Debs.	5%	5%	79—82	...	...	81	Feb. 20	6 2 0	Jan., July.	97	79
$4.785,000	$1,000	Manila Elec. R. R. and Ltg. Corp. 5% Gld. Bds.	5%	5%	98½–100½	...	...	99½	Feb. 24	5 2 0	Mar., Sept.	104⅜	84
60,000	1	Mansfield & District Trys. Ltd. 6% Cum. Pref.	7½d.	7½d.	½–¹¹⁄₁₆xd	...	...	18/6	Sept. 24	5 3 9	Mar., Sept.	1⅛	¾
$20.000,000	$100	Mexico Tramways Common Stock	$3½	$3½	73—76	...	— 3	72½	Mar. 3	...	Fb.My.Au.No	151½	61
$3,840,000	...	Michigan Untd Rys. Co. 5% 1st Debs & Refdg Bds	5%	5%	91½–93½	...	...	91½	Feb. 24	5 7 0	May, Nov.	101½	89½
600,000£	100	Montreal Street Rly. 4½% Ster. Debs.	4½%	4½%	98—100	...	...	99½	Mar. 2	4 10 0	Fe.My.Au.No.	107	97
150,000	1	National Steam Car	6⅛	year	⅛–⅛	..	— ⅛	15/-	Mar. 4	7 7 9	Dec.	39/9	15/-
5,000	10	Oldham, Ashton, and Hyde Elec. Tramways Ord.	5.–	...	5⅜–6	...	...	7	Apr. 2	...	Mar., Aug.	9⅜	6⅛
5,000	10	Do. do. do. 5% Cum. Pref.	5%	5%	5⅛–6⅛	...	— ⅛	6¼	July 8/12	8 3 6	Feb., Aug.	8⅛	6½
77,893	5	Para Elec. Rly. and Ltg. Co., Ord.	5/-	5/-	4⅞–5⅛	...	— ⅛	4⅛	Mar. 4	9 12 0	May, Nov.	8	4⅛
100,000	1	Perth (W.A.) Electric Tramways Ord.	6d.	7½d.	...	...	...	25/6	Nov. 8/12	...	*Sept.*, Nov.	26/10½	⅜
245,000	1	Potteries Electric Traction Ord.	3½	for '12	⅜–½	...	...	7/9	Feb. 2	7 0 0	April.	⅝	⅜
245,000	1	Do. do. 5% Cum. Pref. ...	6d.	6d.	½–⅝	...	...	11/9	Feb. 19	7 11 6	*Feb.*, Aug.	¾	⅛
124,560	1	Provincial Tramways Ord.	10d.	8d.	⅝–⅝	...	...	18/-	Mar. 2	8 16 6	May. *Nov.*	1⅛	13/-
10,000	10	Do. do. 6% Cum. Pref.	6/-	6/-	9⅜–10½	+ 1	...	10	Mar. 2	5 17 3	June, *Dec.*	11	9
50,000	5	Rangoon Elec. Trys. & Supply Co. 6% Cum. Pref	3/-	3/-	5—5⅜	...	...	5⅛	July 17	5 9 3	June, Dec.	6	5
32,000	10	Shanghai Elec. Construction Co.	10.-	year	11⅜–12½	+ ½	...	10⅜	Dec. 29	3 18 6	May.	12½	6
330,400£	Stk.	Singapore Elec. Trys. Ltd., 5% Debs. Red. ...	5%	5%	88—92	...	...	88½	Feb. 14	5 11 9	Mar., Sept.	91	61
169,570	1	S. Metrop'n Elec. Trys. & Ltg. Co. 6% Cum. Pref	1/2⅜	May. '13	⅜–½	...	...	15/9	May 16, '12	8 0 0	Feb., Aug.	1⅜	⅜
91,720£	Stk.	Southern Elec. Trys. of B.A., 1st Mt. Deb. ...	5%	5%	96⅛–98½	...	— 1½	96¾	Mar. 3	5 1 6	Feb., Aug.	100⅜	90
471,500£	100	Toronto Rly. Co. 1st Mt. 4½% Stg. Bonds ...	4½%	4½%	96—98xd	...	...	98⅛	Nov. 26	4 12 0	Feb., Aug.	104	97
80,000	5	United Elec. Tramways of Monte Video, Ord....	3/-	4/-	4⅜–5⅜	+ ⅛	...	5⅛	Feb. 27	6 16 9	*June*, Dec.	6½	4⅜
90,000	5	Do. do. do. 6% Cum. Pref.	3/-	3/-	4⅜–5⅜	...	...	97/6	Feb. 27	5 14 3	June, Dec.	6⅜	4⅛
500,000£	Stk.	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Debs.	4½%	4½%	95—97	...	...	96½	Mar. 2	4 13 9	Apr., Oct.	109½	94½
40,977	5	Yorkshire (West Riding) Elec. Trys. Ord. ...	...	...	⅜–½	...	...	7/6	Feb. 4	...	*Mar.*	1½	⅜
46,261	5	Do. do. do. 6% Cum. Pref.	1/6	2/6	3⅜–4⅜	+ ⅛	...	84/4	Mar. 2	4 11 6	*Mar.*	4	1⅜

ELECTRIC RAILWAY SHARES.

1,854,720£	Stk.	Central London Ord. Stock (4% Guar.)	...	4	81—83xd	...	...	81⅛	Mar. 3	4 16 6	*Feb.*, Aug.	89⅛	59⅜
572,640£	Stk.	Do 4% Guar. Pref. Stock	4	4	82—84xd	...	...	85½	Feb. 25	4 15 3	Feb., Aug.	92	80
572,640£	Stk.	Do. Deferred Stock (4% Guar) ...	...	4	80—82xd	...	...	80½	Mar. 4	4 17 9	Feb., Aug.	91⅜	42
50,000	10	Liverpool Overhead Ord.	2/6	3/6	4⅛–4¼	...	— ⅛	92/6	Mar. 4	6 7 9	*Feb.*, Aug.	4¼	⅜
1,412,263£	Stk.	Mersey Cons. Ord. Stock	Nil	Nil	5½–6½	...	...	6	Feb. 3	...	*Feb.*, Aug.	8	1
5,732,062£	Stk.	Metropolitan Cons.	1½	1½	42¼–42½xd	...	...	42½	Mar. 4	3 16 0	*Feb.*, Aug.	75⅛	34
2,640,914£	Stk.	Do. Surplus Lands Stock	2½	2½	63—65xd	...	...	63½	Mar. 4	4 4 9	*Feb.*, Aug.	72	58
3,235,000£	Stk.	Metropolitan District Ord.	Nil	Nil	27⅞–28⅜	...	+ 4⅜	30⅜	Mar. 4	...	*Feb.*, Aug.	51½	9½
500,000	10	Underground Electric Railways Co. of London ...	...	...	3—3½	...	— ½	62/6	Mar. 4	...	...	5⅛	1⅜
1,730,000£	...	Do. 4½% Bonds of 1933	4½%	4½%	99—101	...	— 1	100⅜	Mar. 4	4 9 5	Jan., July	102	73
1,192,707£	...	Do. 6% 1st Income Debs.	6⅛	6⅛	113—115xd	...	...	114½	Mar. 3	5 4 9	Mar., Sept.	118	108
6,120,750£	Stk.	Do. 6% Income Bonds	60/-	60/-	90 –91xd	...	...	90½	Mar. 4	6 12 0	Mar., Sept.	97½	18
1,150,477	1/-	Do. "A" Ord.	...	...	⅜ - 7/16	...	— 1/32	8/1⅛	Mar. 4	...	...	⅜	⅜

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sufficient revenue to enable them to meet the interest on the prior lien debenture stock and working expenses. The balance, £14,994, had been retained in the operating companies, the bulk of it being placed to renewals account and the remainder carried forward. The Liverpool Corporation were considering a report by their general manager on the carriage of goods by tramways. This company were willing to co-operate, and he hoped that the Mersey Dock and Harbour Board would shortly be approached to see whether they would do so.

Paisley District Tramways.—The 18th ordinary general meeting was held on February 19. Mr. Owen H. Smith, who presided, said that, although partly due to an additional service of cars, and an increase in the local rates, the increase in expenses was mainly owing to increased cost for the maintenance of the track and roadway, due to damage caused by the increasing traffic of motor lorries and other heavy vehicles. This matter was receiving the attention of the directors. A dividend on the ordinary shares was paid for the first six months at the rate of 2 per cent., but owing to this large expenditure they thought it advisable not to pay any further amount this year. The report for 1913 showed that the revenue was £62,876, and expenses £41,476, leaving £21,400. £4,500 is placed to general reserve, £3,750 has been paid for dividend for the half-year on 5 per cent. cumulative preference shares, £1,000 placed to preference share sinking fund for half-year to June 30, and £1,620 paid as interim dividend at rate of 2 per cent. per annum for half-year on ordinary shares. The directors recommended applying £3,750 to final preference dividend, £1,000 to preference share sinking fund, and £2,864 forward. Traffic receipts showed an increase of £4,129 and expenses an increase of £5,807.

Tramways, Light, and Power Company.—Viscount Chilston presided at the first ordinary meeting on February 27. In moving the adoption of the report, he stated that the company was formed in December, 1912, when 300,000 6 per cent. cumulative preference shares of £1 each were offered to the public. An issue was made of £200,000 5 per cent. debenture stock in December last, and the proceeds of this issue were sufficient to meet the capital obligations undertaken when the company was formed, and to satisfy the purchase price of the Midland Electric Light and Power Company. That company owned the whole of the issued share capital and debentures of the other companies which they had acquired, viz., the Derbyshire and Nottinghamshire Electric Power Company, Nottinghamshire and Derbyshire Tramways Company, the Leicestershire and Warwickshire Electric Power Company, and the Leamington and Warwick Electrical Company. They had under consideration the acquisition of other properties, provided the cash yield on the purchase price was attractive. After paying this company the interest and dividends shown in the profit and loss account, the various subsidiary companies had balances carried forward amounting to nearly £4,000. The directors had every reason to be satisfied with the earnings of the current year.

The Edinburgh and District Tramways Company.—The report of this company for the year ended December 31, 1913, presented at the annual meeting, shows that the cable installation is still working with remarkable economy. The receipts, working expenses, and so forth are given below with the figures for the previous year :

	1913.	1912.	Increase or Decrease.	1913, Per Mile Run.	1912, Per Mile Run.
Receipts—				Pence	Pence
Traffic receipts	£292,287	£295,096	−£2,809	10·83	10·61
Other receipts	2,815	2,372	+ 443	0·10	0·08
Total receipts	£295,102	£297,468	−£2,366	10·93	10·69
Expenditure—					
Working expenses and general charges ...	£155,847	£151,776	+£4,071	5·77	5·45
Corporation charges for rent, etc....	112,678	111,759	+ 919	4·18	4·02
Total expenditure ...	£268,525	£263,535	+£4,990	9·95	9·47
Profit	£26,577	£33,933	−£7,356	0·98	1·22

Mr. B. Hall Blyth, speaking at the annual meeting, said that the strike prevented any comparison being made with the preceding year. An increase of £3,500 in the coal bill was entirely due to the price of coal, which last year cost 9s. 10·25d., as against 7s. 5·69d. for 1912. For the current year they had been able to make contracts at a slightly less figure. The receipts amounted to £295,102, which was £2,366 less than for the previous year. The net profit was £26,577, which was £7,356 less. They had put £9,000 further to the general reserve, which would be mainly used in renewing lines, and the balance, after payment of the dividends mentioned in the report, had been divided between deferred and preferred shareholders. The line to Slateford, which was forced upon them by the Corporation, was run last year at a loss of £1,170. They had entered into an agreement with the Corporation for the working of certain motor omnibuses on the south side. They had agreed to work the omnibuses for the Corporation, undertaking no liability whatever, except that they gave the service of the officials of the company. If the vehicles paid the Corporation got the whole profit, and if there was a loss the Corporation would bear it.

PERSONAL.

Mr. R. Lomax, electrical engineer to Stockport Council, has had his salary raised to £600 from £500.

Mr. Barnes Kay, tramways manager and electrical engineer to Haslingden Council, has been voted an increase of salary.

Mr. A. T. Lambert, general manager of the Maidstone Corporation Tramways, has been granted an increase in salary of £50 per annum.

Mr. Hugh Roger has been appointed by the National Electric Construction Company resident engineer at the Bo'ness electricity works.

Mr. G. H. Baillie has been awarded the Crompton medal of the Institution of Automobile Engineers for the best paper during the session 1912-13. His paper dealt with springs.

Mr. C. Barber has been appointed manager of the municipal department of Mr. Conway Jenkins, of 175, Piccadilly, London, W., concessionaire for the "Fram" electric vehicles.

Mr. R. F. Dixon, of Hull Corporation Tramways, has been chosen from 91 applicants for appointment by Southampton Council to the post of works superintendent in the tramways department.

Mr. C. N. Hefford, manager of Leeds Corporation electricity department, has been presented by the power consumers with a large silver candelabrum in appreciation of his efforts in maintaining an efficient service during the recent strike.

Mr. Jose Pedriall, administrator-general of the Anglo-Argentine Tramway Company, has been entertained at a banquet by the Italian community in Buenos Ayres in commemoration of the opening of the first underground tramway in South America.

Mr. G. J. Walker, who has acted as chairman of Aberdeen Suburban Tramways Company since its inception, has asked to be relieved from the duties of his office as a director. In their annual report the board state that Mr. Walker's services as a director have been of great advantage to the company.

Mr. E. J. Neachell, engineer and general manager of Liverpool Overhead Railway, at the annual meeting of the company, was praised by Mr. H. C. Woodward, the chairman, for the capacity, industry, and energy he had displayed during the past year. Praise was also accorded to his assistants, Messrs. Hughes and Fox, for their able work.

Mr. S. Dudman, the manager of the new Notts. and Derbyshire Tramways Company, presided at the first supper of the employees. Mr. F. E. Saunders, operating engineer for Balfour, Beatty, and Company, Limited, and Messrs. W. H. P. Wight and H. C. Thomas, the constructional engineers, were among the chairman's supporters.

Mr. Harry A. Blackburn, who has just completed his apprenticeship with Messrs. Workman and Clark, Queen's Island, Belfast, has joined the British Westinghouse Electric and Manufacturing Company, Limited, Trafford Park, Manchester. He is the only son of Mr. A. A. Blackburn, M.I.E.E., M.I.Mech.E., chief engineer, Belfast City Tramways.

Inspector Turner, of the London United Tramways, recently stopped the ninth runaway horse whilst he has been on duty at the junction at Hampton Court Green. Motorman Raymond, who grasped the offside rein, was struck by a shaft of the brougham, to which the horse was attached, and was picked up insensible. He has since been on the sick list.

Mr. E. G. Mawbey, borough surveyor, Leicester, has asked the Electricity and Tramways Committee to recognise in a tangible way the services he has rendered in the laying of the tramway track. He has all along contended that this work was outside his duties as borough surveyor, and it has been stated that the Corporation were saved £20,000 by his scheme of track construction.

Mr. W. J. Larke, who for 14 years has been manager of the power and mining department of the British Thomson-Houston Company at Rugby has, in view of the extensive developments which have taken place at the Rugby, Coventry, and Willesden factories, been appointed to the engineering and manufacturing departments to assist the chief engineer. Mr. Larke's head-quarters will be at Rugby.

Mr. L. C. F. Bellamy, general manager and electrical engineer, Ilkeston Corporation Tramways, and Mr. Brown, his chief assistant, have been granted increases of salaries. During a discussion by the Council it was stated that Mr. Bellamy had not applied for an increase, and that the receipts had gone up considerably. Alderman Shaw, the chairman, said the committee were all agreed that Mr. Bellamy had done excellent work.

Mr. David James, the general manager of the lessees of the Swansea and Mumbles Railway, was referred to by Lord Glantawe, the chairman of the company, at the annual meeting. His lordship stated that the company were under a great obligation to Mr. James for the harmonious relations existing between the two companies. Their interests were identical, and they appreciated Mr. James's ability and energy in the management of the railway.

Promotion and Increased Salaries at Manchester.—The following recommendations have been made concerning the tramways

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staff: Mr. J. Wood, financial superintendent, to be assistant manager, with an increase of his salary from £500 to £600 by four annual instalments; Mr. D. G. Mallalieu, permanent way superintendent, to receive two annual increments of £25 to his salary of £300; Mr. J. T. Oakes, traffic superintendent, to receive an increase of £25 on his salary of £475.

Mr. J. W. Dugdale, general manager of Oldham Corporation Tramways, was reported by the chairman of the Tramways Committee to be confined to bed on February 26. His medical adviser had forbidden him to attend that meeting, and stated that it would be some time before he could resume his duties. The committee decided to forward to Mr. Dugdale an expression of their sympathy. At the previous meeting of the committee Mr. Dugdale was granted an increase of £50 per annum in his salary.

Mr. W. M. Murphy attended a meeting in London on February 18 of the representatives of employers' associations, when a resolution was passed calling upon the Government to set up an inquiry into the working and the effects of the Trades Disputes Act. Mr. Murphy, in supporting the resolution, said employers could beat syndicalism anywhere. If the community would combine against any attempt to starve or hold it up Syndicalism was bound to be defeated. The answer to a general strike was a general lock-out.

Mr. Frank Ayton, tramways manager and electrical engineer to Ipswich Council, and hon. secretary of the Electric Vehicle Committee, has been co-opted as a member of one of the panels of the British Engineering Standards Sub-committee on Electrical Plant. Mr. Ayton has been granted a bonus of £100 by the Ipswich Council for the year ending March 31 next, and a similar bonus for the following year. In 1910 Mr. Ayton received an increase in his salary, when he undertook to remain in the Council's service for five years from that period.

Miss M. Simpson, who, after nearly 13 years' service as cashier to the Tynemouth and District Electric Traction Company, was recently appointed confidential clerk in the borough treasurer's office at North Shields, was presented with a gold pendant set with pearls and a gold chain at the annual dinner of the employees of the company. Mr. J. B. Williamson, one of the directors, made the presentation on behalf of the board. Mr. Jas. Davidson, the oldest member of the employees, handed Miss Simpson a gold bracelet, which had been subscribed for by the staff.

Mr. J. Robertson and Mr. P. Fisher, respectively burgh electrical engineer of Greenock and general manager and engineer of Dundee tramways, have presented to Stirling Council their report on the offer made by Mr. George Balfour for the purchase of the electricity undertaking and the electrification of the tramways. Messrs. Robertson and Fisher set forth their opinion that there was no reason why the Council should not lay down and operate the tramways quite as successfully as a company could do. The Council have asked the two consultants to report further.

Mr. J. Brown, the new traffic superintendent of the Ayr Corporation Tramways, entered the service of the Doncaster Corporation Tramways eight years ago as a conductor. He passed through various grades to that of first-class motorman, and was subsequently appointed traffic inspector. For the vacancy at Ayr there were 120 applicants. Mr. Brown on leaving Doncaster was presented with a marble clock and a pair of bronzes by the tramways and electricity departments. Mr. E. S. Rayner, borough electrical engineer and tramways manager, made the presentation.

London Tramway Officers' Salaries.—London County Council on February 24, on the occasion of the annual revision of salaries, made the following increases: Mr. J. Welling, permanent way engineer in the tramway department, from £575 to £600 a year; Mr. A. R. Owen, tramway and marine claims superintendent, from £500 to £550 a year; Mr. W. E. Ireland, rolling stock superintendent in the tramway department, from £500 to £525 a year. It was also agreed that an assistant rolling stock superintendent should be appointed, and that Mr. H. S. May, first-class assistant, be promoted to the post with an increase of salary from £300 to £325 a year.

Mr. Stephen Sellon, engineer to the Dearne Valley light railway scheme, which is being promoted by a number of local authorites in the colliery district of South Yorkshire, addressed a large meeting held in support of the project at Wath. He said there was a certain amount of opposition that would simmer down, because there was no real backbone in it. He had constructed about 800 miles of tramways, and knew what they cost. He had been the engineer to many undertakings, and therefore knew what such schemes were likely to do. A halfpenny per mile rate would be charged to workmen in the early morning and evening, and at noon on Saturdays, and that, he ventured to say, they would not get from an omnibus company. A resolution in favour of the scheme was carried by a three-fourths majority.

Mr. H. W. Laing, general manager, Blackpool, St. Anne's, and Lytham Tramways Company, was complimented upon his good record by Mr. C. E. Riding, the secretary, at the annual dinner of the employees. Mr. Laing's work, he said, was shown in the good fellowship and loyalty of the staff, in which the directors and himself, for that reason, took a pride. Mr. Preston, a new director, remarked that he had been on many boards, but the one in connection with that company—including Mr. Nicholson, Mr. Smith, and the officials—was the best he had ever had to work with. Mr. Laing thanked the directors for granting the men a week's holiday with pay, and congratulated the motormen on another record year, so that for the past three years they had headed the list for running on the least consumption of electric current in the country.

Mr. H. Holliday, engineer and manager of Torquay Tramways Company, has accepted the position of engineer and manager to the Rhondda Tramways Company. It is reported that Mr. Holliday's successor at Torquay will probably be Mr. Nisbett, at present engineer and manager to the Rhondda company. Mr. Holliday was awarded a gratuity at the annual meeting in recognition of a record year. The chairman said the board had great confidence in him, and that the results and the excellent condition of the undertaking were ample evidence of his abilities as a manager. Mr. Holliday is the son of the engineer and manager of the Hastings and District Tramways Company, and he went to Torquay from the former town when the tramways were installed in 1907. He conducted the undertaking through all the difficulties of the Dolter system, which was replaced by the trolley system. He will take up his new duties at the beginning of May.

Mr. A. H. Stanley, managing director of the various underground railways known as the London Electric Railway, and of the London General Omnibus Company, on February 10 was presented with a silver cigar box by the staff of all departments of the London Electric Railways and power-house as a mark of appreciation of his personal interest and efforts in obtaining for them interchange privilege tickets on all railways. Mr. C. J. Yorke, divisional inspector, made the presentation, and was accompanied on the platform by Mr. J. P. Thomas (superintendent), Mr. A. H Cooper (engineer), and Mr. S. J. Webb (passenger agent). In reply, Mr. Stanley gave some interesting reminiscences of his early days in "a little western town in North America," where he made up his mind to know all there was to know about railways. The London Electric Railways undertakings came into contact with 4,000,000 people daily, and unless the directors had had the hearty co-operation of every man on the staff it would have been impossible to accomplish as much as they had done. There were many problems facing them. One was how to secure sufficient money to carry on the great enterprises for which they were responsible. The other was the labour problem, for labour was asking more and more for the service it rendered.

A TRAMWAY PIONEER.

Mr. Thos. B. Holliday, engineer and general manager of the Hastings and District Electric Tramways Company, has been ill for some time, but he is now on the way to recovery. Mr. Holliday passed from the engineering college to take up work with the Melbourne Tramway and Omnibus Company as a manager during the construction, and later the organisation and operation for traffic of the cable tramway system. After 11 years' work he resigned, and returned to England to join the staff of the late Sir Clifton Robinson as chief engineer. In 1895 he constructed the first Bristol overhead electric tramway, installing two miles of route in six weeks. The company handsomely recognised his work, and he remained in Bristol to organise and operate the lines. The tramway became the show place and the centre for information for most of the large towns in England. Mr. Holliday also undertook the erection of the large power-station. He also had charge for the company of the construction and equipment of the first electric overhead tramway in Ireland (Balls Bridge to Dalkey), afterwards organising and operating the system until it was handed over to the Dublin United Tramways Company. Leaving Ireland, Mr. Holliday immediately commenced the survey of the Middlesbrough and Stockton District Tramways for electric conversion and extensions, preparing with his staff the Parliamentary plans and attending to the carrying through of the bill in committee. His completion and operation of the whole of this system in eight months constituted a record, for which he received a bonus of £500. Here also he organised and started the service. He next surveyed Darlington, Reading, Gloucester, and a goodly portion of the London United system, constructing some of the routes and building the power-station. His seven busy years with Sir Clifton Robinson came to an end when he received an appointment as engineer and general manager with Brighton Corporation, for the construction and afterwards management of the tramways in that town. Subsequently he constructed three miles of extensions, and received from the Council a vote of thanks for the expeditious way in which the work was carried out and for its low cost. After managing the system for some five years Mr. Holliday was offered the position of engineer and general manager to the Hastings and District Electric Tramways Company. He entered upon the appointment at the start of the construction nearly nine years ago. His many friends in various parts of the country will wish him a speedy return to his accustomed activity.

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CONTRACTS AND ORDERS.

Walsall Council have given an order for an oxy-acetylene welding plant to G. Fairlie and Company.

Bournemouth Council have placed an order for spare parts for new cars with the British Westinghouse Company.

H. Lotery and Company, of London, have been awarded a contract for tramway men's uniforms by Bury Council.

J. Smith and Company, of Derby, have received a contract to supply uniforms for Derby tramway employees, at £198.

The Steel Company of Australia have received an order from Prahran and Malvern Tramways Trust for points and crossings.

C. A. Parsons and Company, Limited, have secured a contract for supplying a turbine to Derby Corporation electricity works, at £7,017.

Prahran and Malvern Tramways Trust have accepted the tender of Stewarts and Lloyds (Australia), Limited, for 1,280 steel poles, £6,680.

Messrs. Johnson and Phillips were the successful tenderers for supplying an eight-panel, high-tension, steel-cubicle type switchboard to Plymouth Council.

The Magneta Time Company have received a contract for the installation of a municipal time service at Blackpool and automatic clocks on the tramway routes.

Belliss and Morcom, Limited, of Birmingham, have received an order from Colchester Council for the supply of a 325-KW. steam dynamo (Vickers' dynamo), at £600.

West Hartlepool Council have placed contracts as appended: Tramway men's tunics and trousers, Pearson, Huggins, and Company, London; oilskins, Dowson and Sons, Great Yarmouth.

Hudson and Bowring, Limited, have recently received orders for 94 sets of "H.B." life-guards for Barcelona, 55 sets for Odessa, 10 sets for Bournemouth, and 5 sets for West Hartlepool.

Blackpool Council have placed a contract for new uniforms for the tramway employees with Messrs. Briggs, Jones, and Gibson; for caps with Donnelly and Sons; and for straw hats with Mr. J. Anderson.

Batley Council have placed a contract for a 1,200-KW. turbo-generator with the Brush Electrical Engineering Company, and for 500-KW. and 250-KW. rotary converters with the British Westinghouse Company.

Liverpool City Council have accepted the tender of the North Eastern Steel Company for 2,000 tons of grooved Sandberg silicon steel rails, and of Walter Scott, Limited, for 400 tons of Sandberg silicon railway section rails.

Southampton Council have placed the following contracts: Alternating-current meters, British Thomson-Houston Company, Limited; pipes, troughs, and covers, Doulton and Company, Limited; conduits, Oates and Green, Limited.

Hadfield's Steel Foundry, Limited, have been awarded the following contracts: Tramway points and crossings, Bolton Corporation; tramway junction, at £1,355, and a cross-over, at £342, Newcastle-on-Tyne Corporation; special trackwork for two cross-overs, London County Council.

Sunderland Council have awarded contracts as follow: Cable, British Insulated and Helsby Cables; two switch cabinets, Ferranti, Limited; switch cabinet, A. Reyrolle Company; rewinding two 750-KW. alternators, Phœnix Dynamo Company; links for boiler grates, Babcock and Wilcox, Limited.

Chloride Electrical Storage Company, Limited, have secured an order from Manchester Corporation for a battery of 264-B.N.W. cells, with a capacity of 2,760 ampere-hours at the 1-hour rate, or 5,520 ampere-hours at the 10-hour rate. The battery will be used in connection with a traction load.

Messrs Scholey and Company, Limited, of 151, Queen Victoria Street, E.C., have received from The Maschinenfabrik Oerlikon an order for their special tool steel gear wheels and pinions for the motor equipments to be used in the electrification scheme of the London and North Western Railway.

Mitchells, Ashworth, Stansfield, and Company have received from the London and South Western Railway Company an order for 2,500 Mascolite pads for the electric power cables (in connection with the suburban lines electrification) to rest on in passing over bridges, viaducts, etc., to prevent damage to the cables by vibration.

The Railway Track Supply Company of Great Britain, 79½, Gracechurch Street, London, E.C., inform us that the Great Western Railway have recently placed a further order with them for two "Edison-Buckwalter" warehouse trucks. This is the third order received since September from the Great Western Railway.

The J. G. Brill Company have an order from Blackpool Corporation Tramways for one of the Brill patented radial-axle trucks. Other important tramways have placed orders for the "Radiax" truck, which was described in our issue of December 11, 1913, and is so designed as to permit radiation and secure the stability of the car on straight track.

Huddersfield Council have allotted to the Glasgow Railway Engineering Company a contract for the supply of steel tires and tramcar wheels. They have accepted the tender of the United Electric Car Company for 10 car bodies and trucks, with differential gearing; and of Dick, Kerr and Company, Limited, for electrical equipments for 10 cars.

Leeds Council have allotted contracts as follow: For trackwork, D. Speight and Sons; extension of main switches at electricity works, British Westinghouse Manufacturing Company, Limited, £2,367; two-phase to three-phase switch gear at the electricity works, British Thomson-Houston Company, Limited, £2,985; economiser, E. Green and Son, Limited, £1,350.

The Albion Motor Car Company, Limited, have received an order for eight vehicles from the British Petroleum Company, Limited, London, distributors of "Shell" motor spirit. The order is for two 32-H.P. Albion 3-ton vehicles, and six 25-H.P. 2-ton vehicles. It may be added that the British Petroleum Company purchased their first 3-ton Albion in August, 1913.

The Titan Trackwork Company, Limited, have recently received contracts for special trackwork from the following tramways: Leeds Corporation, Newcastle Corporation, Rangoon Electric Tramways, London United Tramways, Coventry Corporation, Halifax Corporation, Sheffield Corporation, Rochdale Corporation, and Oldham, Ashton, and Hyde Electric Tramways.

The General Electric Company, Limited, through their China company—the General Electric Company of China, Limited—have secured for the third time the contract for "Osram" traction lamps, from the Shanghai Tramways (International Settlement). The General Electric Company of China report that the Osram lamp is giving unqualified satisfaction in that country.

Northampton Council have accepted the tender of Alex. Stark and Company, Glasgow, at £20,352, for the construction of tramway extensions to Far Cotton and Kingsthorpe; a tender of the Brush Company for the supply of car bodies and trucks at £460 per car; and a tender of Dick, Kerr and Company for the supply of electrical equipments for the cars at £289 14s. per car.

The Railway Track Supply Company of Great Britain, 79½, Gracechurch Street, London, E.C., have received an order from the New Zealand Government Railways for 10,000 Vaughan patent rail anchors. This is the second order received from the same source within the last six months. We understand that Vaughan rail anchors are now being extensively employed on a large number of Colonial and foreign railways, where flat-bottom rails are used. Last year an order was placed for 500,000 Vaughan rail anchors by one railway alone.

Salford Council have given contracts as appended: Induced draught plant for heating car shed at central car depot, Pendleton, £71 18s. 6d., Musgrave and Company, Limited; switch gear, for Ordsall transformer sub-station, £603, Ferguson, Pallin, and Company; two three-phase, oil-insulated, self-cooled power transformers, £366, Ferranti, Limited; 40-H.P. slow-speed motor, to drive air compressor, £131 10s., Lancashire Dynamo and Motor Company, Limited; 1,500 yards of 3-way stoneware conduits, 1s. 11¾d. per piece 2 ft. 6in. in length, T. Wragge and Sons, Limited.

Tires for Halifax Omnibuses.—The Council have accepted the offer of Liga Tyres, Limited, of London, to supply tires for motor omnibuses on a mileage basis at the price of ¾d. per mile per vehicle for a period of two years from January 1. In reply to a question, Mr. A. Fawcett, vice-chairman of the Tramways Committee, replied that the chairman and himself met five of the contractors, the biggest makers of tires in the country, and got them to reduce their prices considerably. The committee were perfectly satisfied with these tires, although they were from a German company, and they would save the committee £62 on the two years.

Manchester Corporation have approved of the placing by the Tramways Committee of the appended contracts: Smith and Forrest, pitch; Robert Carlyle, general builders' work, extension of Hyde Road car shed; E. Wood and Company, Limited, constructional steel and iron work, Hyde Road car shed extension; Brush Electrical Engineering Company, Limited, tramcar trucks; British Westinghouse Company, Limited, tramcar motors; Dick, Kerr and Company, Limited, tramcar controllers; British Westinghouse Company, Limited, and Bruce Peebles and Company, Limited, converting plant at several sub-stations; Ferranti, Limited, three 53-K.V.A. transformers for sub-stations.

Liverpool Tramways Committee have placed contracts as follow: Rubber goods, etc., L. Andrew and Company, Avon India-Rubber Company, Limited, George MacLellan and Company, North British

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Rubber Company, Limited; lubricating oils and greases, Dee Oil Company, Limited, Joshua Rea and Sons, Limited, Vacuum Oil Company, Limited: steel gears and pinions, R. W. Blackwell and Company, Limited, F. W. Rowlands and Company; wrought-iron lamp standards, brackets, etc., A. B. Dalzell and Company, Ashmore and Company, Messrs. Killick and Cochran; cast-iron lamp columns and plugs, Newton Chambers and Company, Messrs. Killick and Cochran.

Brush Electrical Engineering Company have received a contract from Batley Council for supplying a 1,200-KW. Ljungstrom turbo-generator. The British Westinghouse Company are to supply and erect one 500-KW. and one 250-KW. rotary converter for the same authority. Great Yarmouth Council, out of 12 tenders received have accepted that of the Brush Electrical Engineering Company for the supply of 600-KW. turbo-alternator, at £3,358. Aberdare Council have accepted the tender of the Brush Electrical Engineering Company for the supply and delivery of four double-deck tramcars, without top covers, at £2,850. With top covers the tender of the Brush Company was £3,346.

Glasgow Council have allotted the following orders: Patented radial-axle truck, J. G. Brill Company; cast-iron pipes, R. M'Laren and Company, Limited; air filter for Pinkston power-station, Heenan and Froude, Limited; asphalt buckets, P. and W. MacLellan, Limited; lead-covered cable, W. T. Henley's Telegraph Works Company, Limited. The Tramways Committee have allotted the following contracts: Armature coils, Manchester Armature Repair Company; special trackwork, Hadfield's Steel Foundry, Limited; E.H.T. rubber cable, British Insulated and Helsby Cables, Limited; tinned iron and zinc sheets, P. and W. McLellan, Limited; wood surface planing machine, John M'Dowall and Sons; metal filament lamps, W. C. Yuille and Company, Limited.

Accrington Council have approved the recommendation of the Tramways Committee for the purchase of a third Collins automatic point controller, two of which have been in operation for two or three years, and have proved very satisfactory. The Council also decided to make application to borrow £9,500 for the extension of car sheds and workshops. They have accepted the following tenders on the recommendation of the Tramways Committee: Five double electrical equipments, Dick, Kerr and Company; two double-deck top-covered bogie car bodies, with vestibules top and bottom, three single-deck bogie car bodies with vestibules, and 10 Brush maximum traction trucks, M.E.T. Type, the Brush Electrical Engineering Company; five double equipments of magnetic track brakes, the British Westinghouse Company.

London County Council have purchased the following tramway materials: Feeder pillars, panels, switches, etc., Johnson and Phillips, £359 12s.: two sets 400-lb. furnace linings, 24 400-lb. crucibles, crucible stands, and crucible muffle rings, and 12 200-lb. crucibles, crucible stands, and crucible muffle rings, the Morgan Crucible Company, £138 4s. 2d.; 150 cwts. press-pahn in sheets 800 mm. by 600 mm., Joseph Thompson, Sheffield, £240. The following tenders have been accepted: Frodingham Iron and Steel Company, 500 tons of slot rails and 1,000 tons of conductor rails, £13,150; Bolckow, Vaughan, and Company, 6,300 tons of track rails and fastenings, of carbon steel, £39,796 5s.; Millar's Timber and Trading Company, 512,000 Jarrah wood paving blocks, at prices ranging from £6 12s. 6d. to £12 13s. 6d. per thousand, according to size and place of delivery; W. W. Howard, Brothers, and Company, 321,000 creosoted deal paving blocks, at prices varying from £7 15s. to £8 18s. per thousand; Acme Flooring and Paving Company, 330,000 creosoted deal paving blocks, at prices from £8 13s. 6d. to £9 10s. per thousand; Brightside Foundry and Engineering Company, temporary water service for condenser of new turbine for Greenwich power-station as an extension of an existing contract, estimated cost, £450; Brush Electrical Engineering Company, traverser required for Abbey Wood car shed extension, £437; British Westinghouse Company, electrical equipment for traverser, £184 5s.; W. H. Smith and Son, contract for advertising business on tramcars for nine years; Lilleshall Company, 500 tons rolled steel bar for type 25 A magnets of magnetic brakes, and 84 tons for type 26 A magnets, £6 10s. a ton, total £3,796.

Proposed Abolition of Halfpenny Fares at Stalybridge.—In consequence of the unsatisfactory state of the finances of the Stalybridge Tramways Board, it is proposed to discontinue half-penny fares.

Extensions and Powers to Increase Fares.—Schemes to extend York tramways from Nessgate to Hull Road, and from Haxby Road to Yearsley Baths, were inquired into by the Light Railway Commissioners on February 25. In regard to the application for powers to charge increased fares, Mr. J. W. Hame, the tramways engineer, explained that the powers were intended to meet race-days and special occasions like the Yorkshire Show. Colonel Boughey, one of the Commissioners, said he thought it better to limit the power to a maximum number of race days and two or three other days and not allow the fares to be raised promiscuously.

TRAMWAY AND LIGHT RAILWAY NOTES.

BELFAST.

REWARDS FOR CAR CREWS—BELLEVUE GARDENS—CARS' ACCESS TO A RAILWAY STATION YARD.

On the report of Mr. Andrew Nance, the general manager, the Tramways Committee have ordered payment of the annual bonuses. These rewards were gained by 119 motormen for careful driving, freedom from avoidable accidents, and good conduct, and of these 28 deserved special commendation. The numbers for the previous year were 127 and 22 respectively. Of the conductors, 125 were entitled to the annual bonus for accuracy in their cash and daily accounts and general good conduct, and of these 42 gained special commendation for exceptional and, in six cases, astonishing accuracy.—The City Council have decided to promote a bill to authorise the expenditure of £15,000 incurred on the construction of the Bellevue Gardens, which have been formed in connection with the Glengormely section of the tramways.—In reply to a question put by a shareholder at the annual meeting of the Belfast and County Down Railway, the chairman of the company said they gave the necessary accommodation at the station for the tramcars, which was most convenient, both for the Corporation and for those who travelled by the cars, and who were largely their own passengers, but they did not pay the Corporation one penny for bringing the cars into the station. They thought they did very well when they gave the accommodation.

BIRKENHEAD.

THE TRAMWAYS AND AN EXTENSION OF THE BOROUGH.

Mr. Cyril Clark, the tramways manager, was one of the witnesses called by the Corporation at the inquiry which was held into the application for the extension of the borough boundaries. He said there had been requests that the tramways should be extended towards Port Sunlight and to Browborough. Replying to a question, he was unable to say what motor omnibus service would be given to Higher Bebington.

BIRMINGHAM.

FIRST-CLASS CAR EXPERIMENT.

February 25 was the date of the opening of the first-class tramcar service on the Hagley Road route, double fare being charged for the seats in the lower saloon only. In order to enable passengers the more readily to distinguish the special cars the fronts of the vehicles are painted a different colour. The blinds inside are of better quality, and the seats are cushioned. A new depot has been opened in Highgate Road.

BLACKPOOL.

SPECIAL CARS FOR EXCURSION TRAFFIC.

So successful have been the toast-rack cars on the five-mile circular tour, for which fourpence is charged, that the Tramways Committee have called for tenders for the supply of six more toast-rack cars, and 24 of this type will then be available. The first cars were illustrated in our issue of October 10, 1912.

BRADFORD.

EXTENSION TO BINGLEY.

The extension of the Brad ord tramways from Nab Wood to Bingley, a distance of 1 mile 1,071 yards, was opened on February 3, when the Lord Mayor of Bradford (Alderman J. Arnold) drove the first car over the new route, and Mr. J. Barrett, chairman of Bingley District Council, drove the second car. The permanent way was begun on September 1 last. The construction of the track and the erection of the poles, which were undertaken at the expense of Bingley Council, have been carried out under the supervision of Mr. W. H. S. Dawson, the Bradford city engineer, and by the staff of his department, at a cost of £25,000. The new tramway is to be worked under a lease as a part of the Bradford system.

CARDIFF.

ADOPTION OF A HAT-PIN BY-LAW.

By 23 votes to six the City Council on February 9 adopted a by-law requiring any female person wearing a hatpin in any street or public meeting place to cause the point to be properly protected by a blunt guard of metallic or other material.—In reply to a question in the House of Commons on February 22, the Home Secretary said if unprotected hatpins could be shown to be a public danger, the local authorities might deal with it in their bills, and in the case of tramways it could be dealt with under the Tramways Act.

COVENTRY.

BOARD OF TRADE RECOMMEND SIDE-GUARDS.

The Corporation have received the sanction of the Board of Trade to the borrowing of £10,000, repayable in 15 years, for the purchase of 10 new cars, the Board stating that the cars should be provided with side-guards to the platforms.

GLASGOW.

THIRD-PARTY INSURANCE—ROUTE NUMBERS—A TRAFFIC RECORD—THE MANAGER AND THE SURPLUS PROFITS.

The contract protecting the tramways department against third-party risks expires at the end of May, and the Tramways Committee

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are asking offers for insurance for another period of years. The premium paid for the year which ended May, 31, 1913, amounted to £26,538, while that for the previous year was £27,068, the sum varying according to the car-mileage run.—The Tramways Committee having reported against a proposal to number the car routes on the ground that numbers would only complicate matters, there was some discussion on their action at the February meeting of the Corporation. In the end Convener Kirkland agreed to take back the report.—To provide accommodation for the large number of passengers, mainly the crowds who were attending the various important football matches in the city, the tramways department ran 781 cars on February 10. This was a record in the history of the department. The usual number on a Saturday at this season of the year is about 770.—Mr. J. Dalrymple, who presided on February 27 at the annual concert of the Tramways Orchestra, remarked that at the present time the Corporation were asking Parliament to allow them to go into a great scheme to make a new bridge over the Clyde. And yet there were members of the Town Council pressing for a reduction of fares. He doubted if the tramwaymen would agree with their aim. There was a great difference of opinion as to what should be done with the surplus. Some people wanted it to be applied to the reduction of rates and some to the building of cottages. Well, he asked, who had the best right to those cottages? He certainly thought it was the wives of the tramwaymen.

LIVERPOOL.

Electrical Point Controllers.

Following a trial of an automatic point controller opposite the Town Hall, the Tramways Committee have decided to equip the whole of the system with these controllers as soon as vacancies can be found in the car sheds for the youths now engaged as point operators.

LONDON.

Return Tickets—Results of Competition—Reserve Fund to be Utilised.

The issuing of return tickets for penny stages on the London County Council Tramways is being discussed, but a decision will not be arrived at until the precise effect of the return tickets for longer stages has been ascertained. The latter concession, which has now had about a year's trial, was granted on account of omnibus competition.—In view of the close of the financial year of the tramways on March 31, it is interesting to note the weekly and aggregate receipts as compared with the corresponding period of 1913. For the week ending February 11 the receipts were £41,567, as against £40,737 in 1913, £42,411 in 1912, and £39,599 in 1911. In 1912 omnibus competition was not by any means general, and the increase over 1911 represented the normal growth of the tramway traffic. The aggregate receipts for the 44 weeks ended February 11 were £1,911,244, or £7,172 more than for the corresponding period of 1913, when the aggregate takings showed a falling off of £87,331. At the similar date in 1912 the total receipts (£2,009,587) showed an advance of £99,644 as compared with 1911.—As it will be necessary to provide by March 31 cash to a considerable extent to meet expenditure on renewals and for revenue purposes, the Council on February 3 authorised the Highways Committee to realise some of the investments held on behalf of the renewals and general reserve funds. From £150,000 to £200,000 will probably be required. The balances standing to the credit of those funds on March 31, 1913, amounted to £906,795.

MANCHESTER.

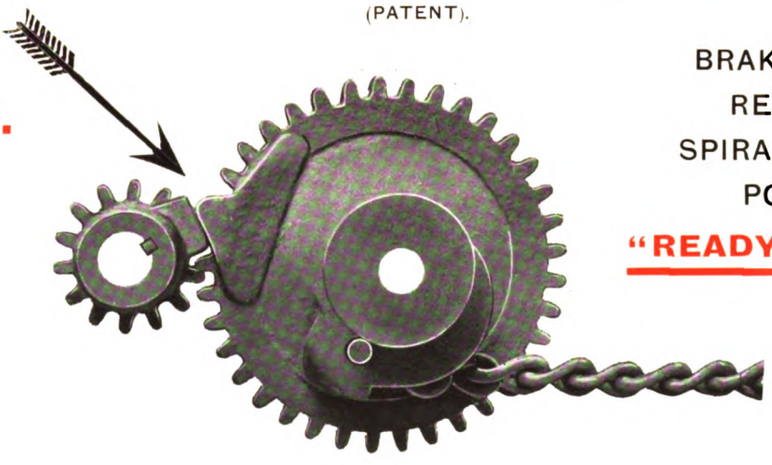
Traffic for Slack Hours—Illuminated Stopping Signs—Means of Transport in Great Cities.

A sub-committee of the City Council has been formed, consisting of representatives of the Parks, Tramways, and Education Committees, for the purpose of discussing the question of facilities for taking the scholars to the parks during the summer holidays. It is suggested that the children should be taken out at 2 p.m. and brought back at five o'clock. Whether they will ride free of charge is a matter not yet decided.—The Tramways Committee are experimenting with illuminated stopping signs, attached to combined tramway and electric light standards.—At the annual meeting of the Institution of Municipal and County Engineers at Manchester on February 20, the visitors were entertained at luncheon by the Tramways and Improvements Committees, Alderman Bowes, chairman of the first-named committee, presiding. Mr. J. A. Brodie, city engineer, Liverpool, moved a vote of thanks to the hosts for the hearty reception. In an allusion to tramways, Mr. Brodie said there was no doubt that we were on the eve of great improvements in connection with the different forms of communication between the centre and outskirts of great cities. Whether it was by means of tramways or motor vehicles, people in the large towns must be conveyed much more quickly than at present between the centre of the town and the suburbs. The chairman, in his reply, paid a high tribute to Mr. McElroy, the tramways manager, and said Manchester were in the happy position of being at the top of the tree among all the Corporations in respect of tramway results. They were handing over approximately £100,000 a year in profits, which meant a sixpenny rate. They also had a reserve fund of £470,000. In responding to one of the toasts, Mr. McElroy touched on the question

The "PEACOCK" **IMPROVED** BRAKE

(PATENT).

THE STOPS.



BRAKES FULLY RELEASED, SPIRAL DRUM IN POSITION "READY TO WIND."

THE STOPS BEING CAST SOLID WITH THE WHEEL AND PINION, IN NO WAY DETRACT FROM THE SIMPLICITY OF THE BRAKE, NOR INCREASE THE COST OF MAINTENANCE.

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of future means of transport in great cities, and remarked that that was a matter which would have to be gone into with the aid of municipal engineers.

NEWCASTLE-ON-TYNE.

RATE AND LABOUR DEMANDS.

In order to avoid an increase of the city rates the Tramways Committee have agreed to contribute £6,000 from the profits in addition to £12,000 already offered.—On February 21 the tramway union employees drew up a programme for increased pay to all grades, a minimum wage of 26s. to all employees over the age of 21, double time for Christmas and New Year's Day; time and a half for three days at race week; and time and a half for all "days-off" which are cancelled and to any man who works his day off at the request of the management.

SHEFFIELD.

A STAND AGAINST UNSOUND FINANCE.

The City Council on February 11 adopted a report by the Tramways Committee stating that they could not at present recommend any reduction of fares. They based their decision on a detailed statement by Mr. A. R. Fearnley, the manager, which showed that halfpenny fares for workmen would swallow the whole of the profits and involve an increase of 4d. in the pound in the rates. Socialist members raised the point whether it was better that profits should be used for cheapening fares for workmen or for reducing rates, which affected working people only to a small extent. Sir William Clegg, chairman of the committee, said that the tramways belonged to the whole community, who found the capital, on which they got only 2 per cent.

DEARNE VALLEY LIGHT RAILWAY INQUIRY.

During a period of 10 days, between February 26 and March 10 inclusive, the Light Railway Commissioners held an inquiry into the application made by the Dearne Valley Light Railway Joint Board, comprising the Urban Councils of Wombwell, Wath, Bolton-on-Dearne, and Thurnscoe, for powers to construct a light railway to connect those towns with Barnsley, Mexborough, and Rotherham. On the first and second day the inquiry took place at Barnsley, and the remainder of the hearing was at the offices of the Light Railway Commissioners.

Mr. Ram, K.C., for the promoters, said that the total length of the proposed tramways would be about 18 miles, and the estimated cost of construction and equipment, inclusive of land and buildings, £90,000, an additional outlay raising the amount to £151,891. In this sum was included £21,650 for the erection of a generating station, but this expenditure would be obviated if a separate Provisional Order was granted to the Councils. The route would serve a much larger number of inhabitants in the near future owing to the extension of the South Yorkshire coalfield.

Mr. Stephen Sellon (engineer to the promoters), Mr. J. B. Hamilton (general manager of the Leeds Corporation Tramways), and Mr. H. England (general manager of the West Riding Tramways and Wakefield and District Light Railway Companies), were the expert witnesses examined in support of the application. Mr. England stated that if other tramways and light railways had been built on similar methods to those proposed in this case, there would have been far more of them in the country to-day. The proposed construction on transverse sleepers, having regard to the possibility of colliery subsidence, would be much more favourable than a concrete foundation. These light railways were required if the district was to be properly developed, for there was a large population living at a considerable distance from the stations. In cross-examination he said that if setts were insisted on along the track the Order would have to be abandoned.

An objection raised by the Yorkshire Power Company was ventilated, and Mr. Ram, K.C., said he was prepared to negotiate for current if the company would abandon their right to charge the maximum.

Mr. R. A. Smithson, F.C.A., of Leeds, presented a statement on behalf of the promoters dealing with the financial aspects of the position.

For the opposition, Mr. R. Hammond, consulting engineer, said it was a most serious thing to spend £150,000 on tramways in the face of omnibus competition, and the possibility of the Great Central Railway electrifying their local service.

Mr. W. B. Cownie, managing director of Mexborough and Swinton Tramways Company, said that his company held a Parliamentary concession for a railless trolley installation from Mexborough to Manvers Main, which they hoped to equip by the end of the year. The cars had been ordered. The district would not stand a tramway.

Mr. A. W. Chivers, inspecting officer of the British Electrical Federation, the undertakers of the Barnsley Light Railways, said there was no need for tramway extensions. His company were running motor omnibuses in the district to test the traffic demands.

Representatives of the Midland and Great Central Railways also opposed, and the County Council were heard in support of their demand for 27 ft. width of road for single track, and 33 ft. for double track, with granite paving throughout.

The Commissioners announced that it was possible they might have an intention of sanctioning a part only of the scheme, and in that event notice of the intention would be given to the local authorities promoting, before the report went to the Board of Trade.

PATENT LIST.

Specially abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

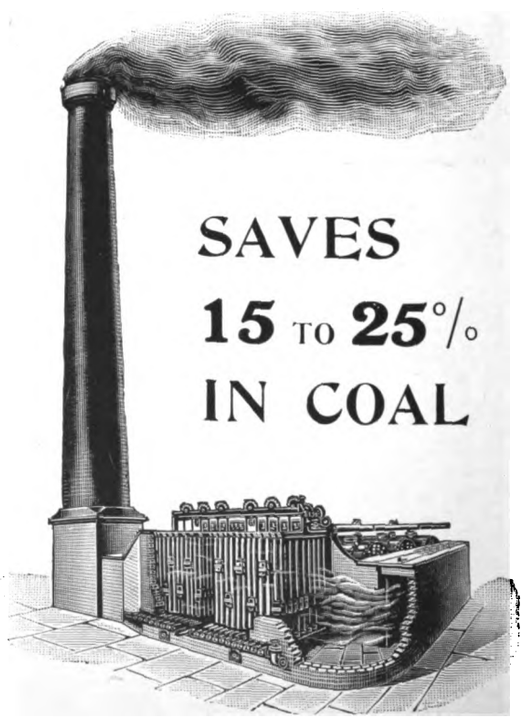
∴ If the inventions have been communicated the names of the communicators are given below in *italics*.

APPLICATIONS.

Applications for Letters Patent have been filed:

2,631 Rail anchor—J. A. Bodkin.
2,680 Safety railway brake—J. H. Dodd.
2,712 Rail joints—D. C. Stephenson.
2,746 Expediting and safeguarding railway traffic—H. A. Thompson.
2,805 Fluid-pressure braking apparatus—W. V. Turner and P. H. Donovan.
2,806 Fluid-pressure brakes—W. V. Turner.
2,827 Electric train lighting, ventilating, and heating systems—Stone and Company, Limited, and A. H. Darker.
2,836 Apparatus for inspection of gauge and rail displacement in tramways and railways—J. M. J. Lundin and A. Wahlström.
2,959 Electric locomotives—British Thomson-Houston Company, Limited *(General Electric Company)*.
3,318 Trolley heads—L. Johnston and G. W. Green.
3,336 Protecting device for use with electric tramway carriages—F. Krannich.
3,350 Reinforced concrete railway sleeper and rail-holding appliances—J. S. Davis.
3,406 Joints between railway rails—C. W. von Roemer and F. C. Lynde
3,449 Rail joints—M. M. Shaw.
3,493 Life-guard for tramway vehicles—P. Boynton.
3,503 Railway signalling apparatus—S. Wormald and W. Stead.
3,552 Electric train or tram control systems—J. R. Beard and W. L. Shand.
3,559 Brakes—R. J. Marshall and W. H. Penman.
3,679 Railway rails—J. B. Baum.
3,794 Rolling stock and tracks for railways—G. Winteringham.
3,907 Railway and tramway crossings—D. McKay.
4,008 Rail ties—D. C. Blose, M. Shultz, J. Koseck, J. Moksha, and W. Maluck.
4,009 Rail joints—G. W. T. Anderson.
4,027 Life-guards—A. Crane and London General Omnibus Company, Limited.

GREEN'S ECONOMISER



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4,131 Train electric control systems—B. Starie.
4,135 Sub-structure for railway crossings—W. P. Day.
4,147 Life-guard for motor omnibuses—F. Gore and F. Savage.
4,233 Electrically-driven vehicles—K. von Kando.
4,358 Control of electrically-propelled vehicles—C. S. Schultz and C. C. A. Hardie.
4,458 Tramcar seats—J. E. Blezard.
4,523 Suspension and tension arrangements for electric trolley wires or contact lines—Siemens-Schuckertwerke G.m.b.H.
4,554 Electric motor control systems—British Thomson-Houston Company, Limited (*General Electric Company*).
4,561 Railroad crossing—V. L. Cooper.
4,624 Railway systems—E. Castanho.

PATENT WEATHER SCREEN FOR MOTOR 'BUSES.
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"We have tried several makes of Oilskins, but none have been equal to the 'Ailsa' make."
"Past results have been so satisfactory that we have this year decided to place the whole of our order in your hands."

4,650 Obstruction removers for rail vehicles—B. Lotzmann.
4,681 Train lighting systems—Vickers, Limited (*F. Krizik*).
4,887 Seats for omnibuses and tramcars—J. S. Stubbs.
4,892 Brakes—V. Lancia.
4,917 Electro-magnetic safety and smooth-running system to be used on railways and tramways—T. A. J. Pile.
4,989 Mud-guard and splash-preventer for motor omnibuses—G. H. Harris.
4,997 Signal bells for use on tramway cars—F. H. Lees and P. Wyatt.
5,026 Rail ties—C. Berg.
5,244 Weather-proof or dry seats for omnibuses—J. H. W. Bourne.

Specifications Published.

1912.

23,417 Electrical token apparatus for railways—Blackall and Jacobs.

1913.

672 Connection of motors of electric tramcars and other rail carriages to prevent side swing—Bulfin.
4,291 Wheels on motor omnibuses for the prevention of side slip and skidding—Cocks.
4,484 Brake apparatus—Spencer.
9,885 Sanding gear for tramway or railway vehicles—Bromley.
15,033 Brake mechanism for railway vehicles—Gresham.
17,850 Trolley wheels—Anderson.
21,299 Rail joints—Riddle and Nove.
22,217 Means for preventing the creeping of railway rails—Paulus.
1,591 Electric motor control systems—Siemens Brothers Dynamo Works, Limited, Lydall and Duke.
3,396 Brake gear—Smith.
8,728 Apparatus for operating the points of railways and tramways—Thomson.
10,148 Vacuum brake apparatus—Gresham.
12,885 Device for securing railroad rails to ties—Rosencrans and Sanderson.
13,421 Device for securing railroad rails to ties—Rosencrans and Sanderson.
18,345 Automatic brake apparatus—Aird.
3,684 Electric motor control systems—British Thomson-Houston Company *(General Electric Company)*.
4,425 Signalling apparatus on tramcars—Heaton.
4,695 Metallic railway sleepers—Schisler
8,267 Track contact devices for electric tramway vehicles—Helfenstein.
16,837 Rail joints.—Broomhall.
18,723 Rail joints—McCoy and Bowersox.
21,347 Street car fenders—Pogue.
23,197 Covering for outside seats of motor ommibuses—Tofield.
2,466 Tramway rails—Crudgington and Wakelam.
4,482 Trucks for railway and tramway vehicles—Curwin *(J. G. Brill Company)*.
6,982 Sealing means for boxes containing the electrical operating mechanism of tramway or railway points, switches, etc.—Quilliam.
8,746 Electro-pneumatic systems and apparatus for railway signalling and for operating points—Irving and British Pneumatic Railway Signal Company.
18,517 Method of insulating electrical conductors—Heany.

TRAFFIC RETURNS.

Colonial and Foreign Tramways.

NAME OF COMPANY.	1913. WEEKS ENDING.					1914. WEEKS ENDING.					AGGREGATE.		
	Feb. 1.	Feb. 8.	Feb. 15	Feb. 22.	Mar. 1.	Jan. 31.	Feb. 7.	Feb. 14.	Feb. 21.	Feb. 28.	Wks.	1914.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine	53.174	53,204	54,907	55,252	55,202	55,023	56,665	58,466	55,561	56,516	9	455,119	+ 17,384
Auckland ... ... (28 days)	...	...	20,117	...	...	...	...	23,552	...	...	32½	159,090	− 439
Brazilian Street ... (month) Mlrs.	46,268	...	...	...	...	54,689	...	...	...	...	26	319,153	+ 54,032
Brazilian Traction	85,417	94,955	88,326	88,867	93,150	91,145	95,500	95,232	96,639	97,108	9	854,438	+ 63,054
Brisbane ... ...(month)	24,810	...	...	...	...	28,330	...	...	...	...	5	28,330	+ 3,520
British Columbia ... (month) $	743,271	...	...	...	...	777,102	...	...	...	...	31	5,330,828	+336,733
Buenos Aires Port and City (month)	6,428	...	...	...	...	8,217	...	...	...	...	5	8,217	+ 1,789
Buenos Ayres Lacroze ...(month)	44,601	...	...	...	40,624	43,651	...	...	...	40,377	35	356,923	+ 8,140
Calcutta ... ... Rs.	61,392	63,690	60,302	62,254	65,510	64,474	67,046	67,952	66,874	69,418	9	6,16,662	+ 29,368
Cape Town ... ...(month)	13,895	...	...	...	...	14,646	...	...	...	...	5	14,646	+ 751
Carthagena and Herrerias (month)	3,324	...	...	...	3,053	2,776	...	...	...	2,919	9	5,695	− 682
Cordoba ... ...(month)	11,899	...	...	...	...	12,735	...	...	...	...	44	133,055	+ 11,904
East India ... ...(month)	1,850	...	...	...	1,622	1,938	...	...	...	1,701	30	13,518	+ 516
Kalgoorlie ... ...(month)	...	...	...	...	...	...	...	...	...	...	—	—	—
La Plata ... ...(month)	5,575	..	...	...	4,942	5,296	...	...	...	4,766	9	10,062	− 455
Lima ... ...(month)	34,128	...	...	...	...	37,930	...	...	...	...	5	37,930	+ 3,802
Madras ... ... Rs.	26,530	(2 weeks)	25,388	(2 weeks)	22,078	28,836	(2 weeks)	28,738	(2 weeks)	23,055	9	1,09,932	+ 9,346
Melbourne ... ...(month)	67,000	...	...	...	...	68,500	...	...	...	...	5	68,500	+ 1,500
Mexico ... ... (month) $	561,635	...	...	...	...	579,361	...	...	...	...	5	579,361	+ 17,726
Montevideo ... ...(month)	38,061	...	...	...	34,368	38,256	...	...	...	35,805	17	137,901	+ 1,366
Para	4,122	4,469	4,266	4,229	4,087	3,203	3,709	3,565	3,648	3,468	13	44,395	− 8,885
Port Elizabeth ... ...(month)	4,498	...	...	...	...	4,830	...	...	...	...	5	4,830	+ 332
Shanghai ... ... $	18,967	22,748	19,905	19,332	19,421	26,600	25,000	23,200	23,600	21,000	8	189,800	+ 32,137
Singapore ... ... $	9,598	13,468	12,082	12,360	11,088	12,812	12,449	13,924	12,008	12,072	9	108,573	+ 6,455
Toronto ... ... (month) $	776,928	...	...	...	...	847,945	...	...	...	...	5	847,945	+ 71,017
Winnipeg ... .. (month) $	351,497	...	...	...	...	382,670	...	...	...	...	5	382,670	+ 31,173

(*Continued on page 220.*)

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TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1913. WEEKS ENDING.					1914. WEEKS ENDING.					AGGREGATE.		
	Feb. 1.	Feb. 8.	Feb. 15.	Feb. 22.	Mar. 1.	Jan. 31.	Feb. 7.	Feb. 14.	Feb. 21.	Feb. 28.	Wks.	1914.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Aberdeen Corporation ...	1.334	1.426	1.379	1.339	1.376	1.363	1.458	1.473	1.431	1.474	39	62.584	+ 3.499
Accrington Corporation ...	505	523	539	497	495	528	545	559	565	546	47	27.077	+ 2.362
Ayr Corporation ...	189	202	197	183	186	232	241	234	239	230	41	15.312	+ 2.215
Bath Electric ...	662	669	681	716	640	642	727	733	729	734	8	5.594	- 11
Birkenhead Corporation ...	1.270	1.150	1.108	1.074	1.293	1.411	1.233	1.244	1.197	1.413	48	61.992	+ 5.648
Birmingham Corporation ...	11.485	11.455	11.384	11.151	11.184	12.125	12.287	12.678	12.568	12.409	48	572.221	+ 48.241
Blackburn Corporation ...	1.067	1.064	1.247	1.058	1.048	1.070	1.157	1.105	1.166	1.203	48	62.110	+ 5.162
Blackpool Corporation ...	440	649	468	446	473	461	735	532	566	535	47	81.270	+ 12.590
Bolton Corporation ...	2.403	2.503	2.538	2.434	2.535	2.720	2.577	2.707	2.550	2.606	48	131.048	+ 7.217
Bournemouth Corporation ...	1.477	1.573	1.490	1.461	1.643	1.568	1.563	1.646	1.624	1.632	48	97.986	+ 9.684
Bradford Corporation ...	5.166	5.338	4.979	5.572	5.224	5.435	5.854	6.266	5.702	5.818	47	282.954	+ 17.675
Brighton Corporation ...	761	771	754	688	719	763	796	796	784	870	48	51.126	+ 3.112
Bristol	6.685	6 944	6.508	6.125	6.562	7.037	7.543	7.236	7.519	7.206	8½	60.696	+ 4.044
British Electrical Federation ...	37.811	38.102	38.509	36.850	38.308	48.652	51.468	50.689	50.300	51.242	—	—	—
Burnley Corporation ...	1.517	1.528	1.552	1.527	1.562	1.614	1.621	1.629	1.625	1.596	48	81.299	+ 8.196
Burton-on-Trent Corporation ...	264	265	249	244	249	279	280	285	281	281	48	14.128	+ 748
Bury Corporation	1.183	1.248	1.205	1.195	1.247	1.256	1.287	1.302	1.248	1.289	48	64.393	+ 2.436
Cardiff Corporation	2.438	2.473	2.360	2.250	...	2.532	2.590	2.607	2.579	...	47	127.457	+ 11.879
Chatham and District	791	821	829	734	784	737	836	804	830	798	8	6.474	- 294
Chesterfield Corporation	236	236	238	229	235	243	258	260	257	254	47	12.324	+ 1.332
Colne and Trawden	230	233	225	231	231	237	238	261	248	240	9	2.125	+ 102
Cork Electric	434	428	449	393	410	428	445	460	453	442	8	3.576	+ 20
Croydon Corporation	1.464	1.445	1.429	1.349	1.405	1.387	1.546	1.486	1.537	...	46	76.267	- 6.104
Darlington Corporation	219	236	219	212	215	239	243	249	248	241	48	11.952	+ 1.100
Derby Corporation	851	903	862	829	863	901	951	978	944	929	48	46.918	+ 4.211
Dover Corporation	196	195	188	177	184	177	195	192	192	193	48	11.536	+ 98
Dublin and Lucan	127	108	106	108	113	106	122	111	109	116	8	925	- 16
Dublin United	5.460	5.504	5.454	5.065	5.145	5.134	5.336	5.262	5.252	5.213	8½	42.709	- 2.298
Dundee City	1.133	1.195	1.190	1.147	1.131	1.191	1.244	1.248	1.247	1.204	41	53.573	+ 3.658
East Ham Corporation	1.091	1.069	1.046	1.030	1.056	1.041	1.046	1.038	1.016	1.003	48	49.542	- 2.328
Exeter Corporation	280	276	267	241	259	274	306	294	288	289	48	16.150	+ 734
Gearless Motor 'Buses	...	...	...	...	...	439	462	443	434	478	9	3.811	—
Glasgow Corporation	18.660	19.183	19.322	19.211	19.411	20.157	20.871	20.948	20.737	20.595	39	796.268	+ 56.755
Glossop (Urban Elec. Supply Co.)...	125	124	121	114	117	129	118	127	118	118	9	1.074	- 6
Halifax Corporation	1.810	1.787	1.892	1.810	1.815	1.823	1.913	1.961	1.992	1.986	47	99.045	+ 3.780
Hastings and District	702	652	727	662	674	616	711	711	714	744	8	5.463	- 136
Huddersfield Corporation	2.028	1.983	2.033	1.947	2.000	2.062	2.091	2.160	2.200	2.170	48	102.179	+ 5.316
Hull Corporation	3.109	3.035	3.018	2.957	2.971	3.140	3.290	3.222	3.123	3.121	48	151.935	+ 7.804
Ilford U.D. Council	412	414	403	396	407	416	432	434	428	435	47	21.490	- 877
Ilkeston Corporation	114	114	114	111	113	126	120	127	122	126	49	6.430	+ 893
Ipswich Corporation	379	353	350	329	345	345	367	384	360	366	48	21.544	+ 733
Isle of Thanet	264	284	272	255	285	260	300	297	297	337	22	7.333	+ 581
Kilmarnock Corporation	152	157	151	154	147	160	167	159	169	161	41	7.232	+ 471
Lanarkshire	1.486	1.423	1.586	1.508	1.511	1.645	1.763	1.785	1.860	1.816	8	14.826	+ 1.800
Lancashire United	1.361	1.323	1.337	1.300	1.302	1.498	1.592	1.519	1.544	1.521	8	12.272	+ 1.674
Leeds City	7.641	7.785	7.321	7.567	7.545	7.996	8.107	8.130	7.940	8.181	48	388.158	+ 16.330
Leicester Corporation	2.653	2.735	2.562	2.534	2.574	2.714	2.832	2.808	2.794	2.785	9	23.324	+ 1.338
Leith Corporation...	629	635	629	614	615	655	666	676	666	685	41	29.180	+ 1.402
Leyton U. D. Council	1.145	...	...	...	...	1.170	...	...	...	...	4½	58.277	- 165
Liverpool Corporation	11.861	12.172	11.762	11.575	11.792	12.643	12.707	12.902	12.381	12.716	8½	106.904	+ 5.632
Llandudno and Colwyn Bay ...	147	142	162	144	164	140	153	152	163	162	13	1.938	+ 4
London County Council	40.432	40.917	40.737	39.235	39.340	40.062	41.985	41.567	42.517	41.944	47	1.995.705	+ 13.058
London General Omnibus... ...	51.974	55.526	51.455	51.002	54.752	53.172	57.976	53.495	54.910	58.520	9	487.644	+ 4.201
London United	5.268	5.189	5.249	4.956	5.245	5.013	5.559	5.342	5.622	5.465	9	44.232	+ 678
Lowestoft Corporation	143	137	134	131	125	154	179	155	151	154	21	3.902	+ 351
Maidstone Corporation	156	157	161	146	153	152	171	159	170	162	48	9.599	+ 627
Manchester Corporation	16.695	16.388	16.016	16.471	16.848	17.076	17.095	17.335	17.087	17.262	48	839.681	+ 36.301
Metro. Electric Tramways ...	8.424	8.196	8.428	8.034	8.294	7.958	8.541	8.417	8.528	8.487	9	68.901	- 188
Nelson Corporation	202	174	170	204	176	178	180	202	188	211	48	9.970	+ 554
Newcastle-on-Tyne Corporation ...	4.508	4.696	4.578	4.398	4.542	4.972	5.200	5.012	4.916	4.940	48	236.246	+ 21.392
Newport (Mon.) Corporation ...	706	748	680	680	712	739	746	766	735	736	48	36.798	+ 2.540
New St. Helens and District ...	676	704	695	652	648	686	748	737	758	736	35	28.281	+ 2.603
Northampton Corporation... ...	512	530	525	462	487	503	571	535	544	520	48	27.376	+ 1.616
Nottingham Corporation	3.196	3.157	3.053	2.976	3.063	3.187	3.264	3.189	3.240	3.272	47½	158.691	+ 6.939
Oldham Corporation	2.034	2.019	1.991	2.067	1.994	2.096	2.179	2.155	2.132	2.118	49	107.797	+ 7.402
Portsmouth Corporation	1.706	1.795	1.705	1.503	1.597	1.735	1.920	1.800	1.831	1.847	48	106.885	+ 7.130
Preston Corporation	812	791	787	749	730	772	813	837	842	810	48	42.172	+ 2.591
Provincial...	1.554	1.584	1.528	1.459	1.522	1.558	1.669	1.622	1.603	1.648	21	36.859	+ 2.109
Reading Corporation	584	640	610	551	622	645	651	654	669	629	47½	33.018	+ 2.318
Rochdale Corporation	1.439	1.424	1.385	1.429	1.410	1.475	1.488	1.546	1.430	1.433	48	76.253	+ 3.124
Rotherham Corporation	860	883	839	869	879	1.071	1.063	1.032	933	877	48	48.791	+ 9.853
Salford Corporation	4.774	4.889	4.661	4.743	4.880	5.072	5.046	5.137	5.125	5.083	48	250.694	+ 11.611
Sheffield Corporation	6.957	7.520	7.080	6.895	7.049	7.514	7.670	7.530	7.559	7.476	48	360.204	+ 26.147
Southampton Corporation... ...	1.156	1.151	1.145	1.036	1.044	1.073	1.178	1.183	1.206	1.151	47	61.996	+ 3.372
Southend-on-Sea Corporation ...	539	538	572	516	544	583	668	666	714	704	48	43 907	+ 7.564
South Metro. Tramways	700	695	720	652	697	922	1.048	945	996	1.006	9	8.072	+ 2.238
South Shields Corporation ...	617	627	618	592	601	670	701	713	687	699	48	34.474	+ 3.977
Sunderland Corporation	1.251	1.371	1.232	1.236	1.213	1.421	1.342	1.365	1.335	1.336	48	69.090	+ 6.251
Swindon Corporation	149	147	155	133	138	136	144	159	158	159	47	7.827	+ 436
Tramways (M.E.T.) Omnibus Co. ...	...	171	526	766	862	7.895	8.569	8.020	8.086	8.706	9	68 437	+ 66.074
Tyneside Tramways and Tramroad ...	437	453	480	478	486	455	483	489	489	488	8	3.731	+ 124
Wallasey Corporation	983	1.000	984	946	979	1.070	1.099	1.109	1.067	1.033	48	57.815	+ 5.259
Walsall Corporation	598	618	572	569	593	629	617	663	620	609	9	5.181	+ 113
Walthamstow U.D. Council ...	625	644	602	620	634	659	707	693	686	704	48	35.483	+ 1.480
Warrington Corporation	438	450	446	435	424	428	440	442	443	422	48	21.158	+ 412
West Ham Corporation	2.645	2.577	2.499	2.460	2.502	2.478	2.648	2.671	2.690	2.627	47½	129.036	+ 4.139
Wigan Corporation	1.405	1.394	1.381	1.312	1.313	1.422	1.504	1.451	1.489	1.439	47½	70.859	+ 6.438
Wolverhampton Corporation ...	1.014	1.008	942	932	999	1.108	1.039	1.070	1.009	1.016	49	52.467	+ 2.634
Yorkshire (West Riding)	1.283	1.595	1.266	1.285	1.293	1.469	1.632	1.405	1.458	1.491	9	12.863	+ 1.113

Electric Railways.

NAME OF COMPANY.													
Central London	5.673	5.206	5.500	5.495	5.304	5.106	4.921	5.049	5.163	5.050	9	46.530	- 3.035
City and South London	3.082	2.893	3.099	3.090	2.946	2.792	2.674	2.818	2.752	2.848	9	25.724	- 1.904
Liverpool Overhead	1.544	1.594	1.525	1.550	1.566	1.647	1.613	1.634	1.574	1.608	9	14.837	+ 514
London Electric	14.955	14.155	14.625	14.490	14.200	14.265	14.105	14.595	14.525	14.420	9	131.835	- 498
Mersey	2.310	2.363	2.287	2.257	2.263	2.333	2.300	2.264	2.267	2.294	9	20.454	+ 65
Metropolitan	16.649	15.792	16.145	16.025	15.865	17.933	17.334	17.653	17.686	17.632	9	161.408	+ 13.962
Metropolitan District	13.273	13.016	13.189	13.053	13.062	12.900	12.984	13.368	13.233	13.519	9	119.053	+ 5

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officals and the principal particulars relating to each undertaking.

The directory is revised as occasion requires, and is the most up-to-date and comprehensive list published.

The Tramway & Railway World can be obtained, post free, at the following rates:
For the United Kingdom—
Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
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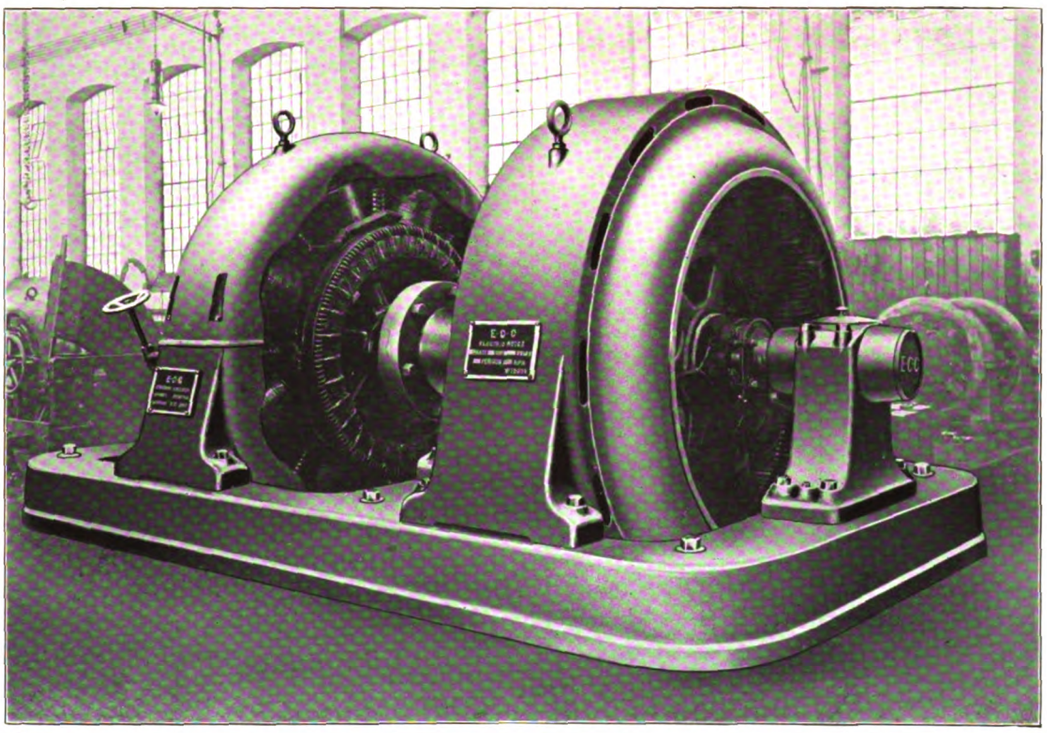
E.C.C.

ELECTRICAL PLANT AND SWITCHGEAR

OF EVERY DESCRIPTION.



600 KW. SYNCHRONOUS MOTOR-GENERATOR.

THE

ELECTRIC CONSTRUCTION CO., LTD.

HEAD OFFICE:

TELEPHONES—10920 Central; 2671 London Wall.
TELEGRAMS—"Concordance," London.

ADDRESS—
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9, NEW BROAD STREET,

LONDON.

WORKS:

TELEPHONES—75 and 430 Wolverhampton.
TELEGRAMS—"Electric," Wolverhampton.

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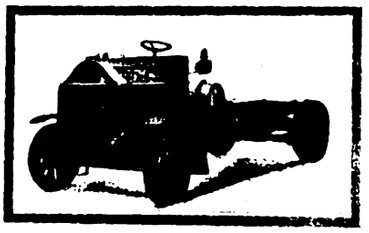
BRITISH BERNA MOTOR LORRIES, LIMITED.

BRITISH ALL BRITISH.



35/40 H.P. 5-Ton British Berna Motor Lorry.

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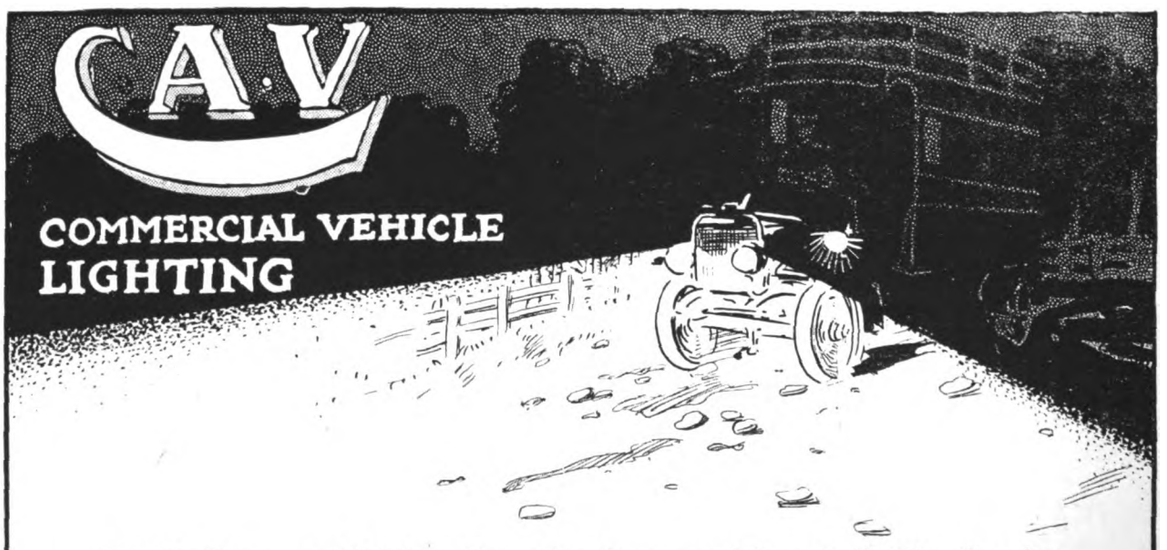
FOR FULL PARTICULARS WRITE:

British Berna Motor Lorries, Ltd.

Avonmore Road, West Kensington, London, W.

Telephone—4542 Western. Telegraphic Address—"Klibergar, London."



C.A.V. Dynamo Lighting Sets for Commercial and Public Service Vehicles are purposely designed to stand up to the enormous wear and tear of excessive vibration and heavy long distance work Our type "H" Dynamo is the culmination of the engineer's ideal—greatest strength combined with greatest efficiency—while the batteries are practically indestructible

Further particulars sent free on application.

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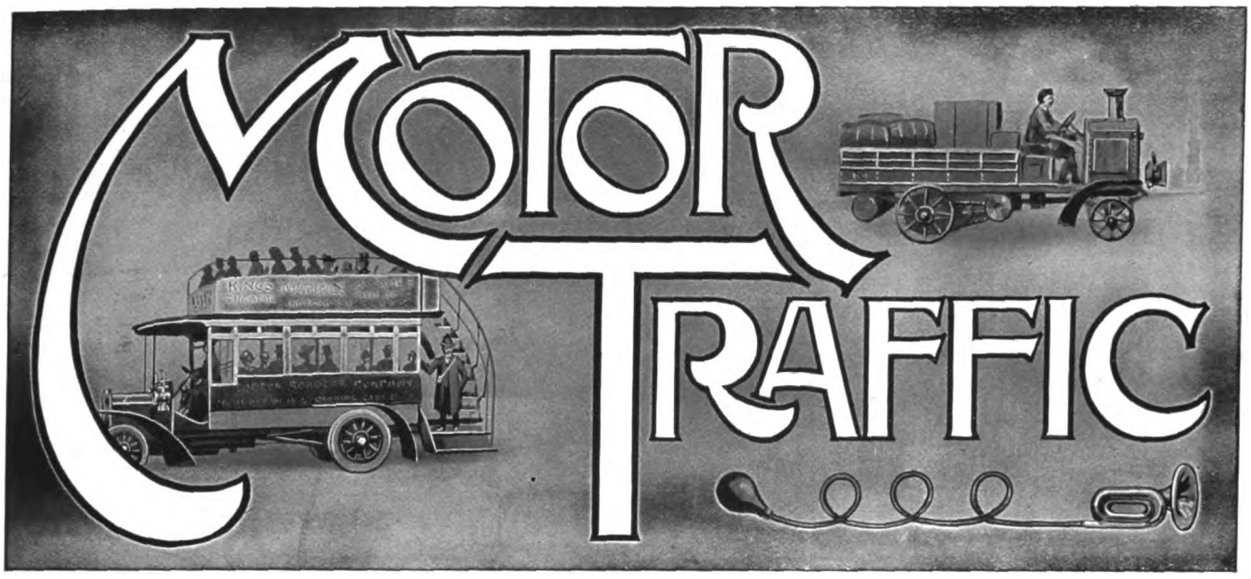

While lacking statistical details which would have been of public interest, the report and accounts of the London General Omnibus Company for the year ended December 31 last constitute an interesting document. A comparison of the total receipts with the amount of capital issued shows that while the latter aggregates only £3,150,480 out of an authorised capital of £5,500,000, the general receipts totalled £3,258,197, this sum including traffic takings, private hire, advertising, and sundries. On the other hand, the three headings of the expenditure—apart from £16,613 for depreciation of leases, plant, machinery, etc., and £175,000 reserve for renewals and contingencies—make up the heavy amount of £2,769,826. Of that sum drivers' and conductors' wages took up £828,213, while £719,489 was required to meet "road expenses," these comprising licences, superintendence, ticket service, omnibus lighting, fuel, lubrication, compensation, and law charges in connection with traffic, garage expenses, etc. Maintenance expenses, at £1,102,218, included £1,084,220 for rolling stock, tires, etc., and £17,998 for premises, furniture, and fixtures. General expenses totalled £124,904, made up of rents, rates, taxes, directors' fees, office expenses, stationery, advertising, and insurance. £105,446 was appropriated for interest on debentures and for redemption of debentures, and £241,283 remained as available for dividend on the shares of the company. That amount sufficed to pay 18 per cent. and to leave £34,197 to be carried forward. A sum of only £424,887 was added to the capital expenditure during the year. The chairman's remarks supply the key to this outlay, £245,407 being for the purchase of additional omnibuses, equipment, and plant, and £179,480 for land and buildings for new garages. Nine of these structures were erected during the year, and as five others are in course of erection or extension, this branch of the company's activity has probably reached its limit, for there are many more garages than the fourteen mentioned.

Details are lacking as to working costs per mile, the amount of mileage, petrol consumption, etc. As the mileage is much greater in the summer than in the winter not much additional information can be deduced from the chairman's statement that from January 1 to February 12, only one fatal accident had occurred in 1,020,752 miles run. In 1912 there was one fatality for every 443,057 miles, and in 1913, one for every 665,402 miles. The number of fatalities in each year was not mentioned. Praise is due to the company for the great improvement so far recorded this year, and for so rapidly fitting their vehicles with side-guards, which have been instrumental in avoiding what might otherwise have been fatal accidents in 46 cases. During the year, 676,328,145 passengers were carried, or an average of 1,853,000 per day, at an average fare of 1·33d. The year 1913 was the first complete twelve months of the company's existence, so that it will be necessary to wait until the end of the present year before statistical comparisons can be made. As on Sundays and early closing days, during a great part of the year the omnibuses are being used for pleasure purposes by a vast number of people, whose thoughts are turned in that direction by the use which the company is making of the power of advertising, the present year should bring a great addition to the number of passengers. It is doubtful, however, whether an improvement can be effected in the remarkable mechanical efficiency now attained, as is shown by 99·8 per cent. of the total scheduled mileage having been run during the past year.

A sub-committee of the Sevenoaks Urban Council, appointed to advise on the purchase of a motor fire engine, recently presented a report containing a conclusion that differed materially from the views of less highly qualified bodies, such as the fire brigades of London and almost all other great cities, the Mechanical Transport Committee of the War Department, and the great majority of those who have hitherto been popularly supposed to know something about fire engines and motor vehicles. Doubtless the publication of the views of this sub-committee would have caused a revolution of feeling throughout the world, had not the Council themselves decided upon the course of politely adopting the report, and immediately inviting tenders for a machine embodying the most important of those features which, in face of the superior knowledge of the sub-committee, so many people have regarded as efficient and sound. The sub-committee pointed out many grave disadvantages connected with the Dennis fire engine, these disadvantages having previously escaped the notice of the manufacturers and of the advisers and officers of some 200 fire brigades to which their machines have been supplied. The sub-committee directed attention to the drawbacks attaching to the use of the turbine pump, and based their indictment on the assumption that wear is necessarily proportioned to speed. But the point missed is that wear and tear depends on the nature

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MOTOR TRAFFIC.

as well as the speed of the work done. A turbine pump rotates smoothly and without shock. A reciprocating pump, though making much fewer revolutions per minute, is obliged twice during each revolution to start a heavy mass into motion, to speed it up, to slow it down, to stop it, and to reverse its direction of motion. As to mechanical details, the sub-committee mention unfavourably the steering pinion of a Dennis machine, whereas the steering is worm and segment. They compare the worm drive with the chain drive without apparently being aware that the presence of the latter does not do away with the need for a differential gear. But it was the speed of the turbine, otherwise known as the centrifugal pump, and the possibility of this pump giving trouble, that worried the sub-committee most, and they must have been very pleased to feel that in adopting their recommendations, the Council have saved Sevenoaks from importing such a fearsome piece of machinery. The Council went straight away from the meeting and advertised inviting tenders for a "Petrol motor fire engine of 45-H.P., fitted with a centrifugal pump of 300 gallons capacity." The present position is consequently a little fogged. The Council have agreed on a slow running pump and are asking for a turbine pump—a type that runs both fast and smoothly.

A correspondent, who lately returned to this country from the by-ways of civilization after an absence of four or five years, observes that to such persons as himself there presents itself an enormous and most notable improvement in the working of London's omnibus services. Such is indeed the case. For reliability and quietness of running the change from the noisy and ponderous rattletraps that one used to see and—more especially—hear, during their somewhat infrequent periods of activity, has been quite as marked as the corresponding difference between the early motor cars for private use and the silent machines of to-day's well-to-do man. True, the surfaces of London's streets and roads have also been greatly improved, both actively upon the desire of local authorities to avoid dust and other undesirable accompaniments of heavy traffic, and also passively from the lessened pounding by horses' feet. Yet, even allowing for this, the omnibus of to-day is a lighter, stronger, and more reliable vehicle in every way than was thought possible a few years ago, and as a consequence its field of service extends wider almost every day.

The omnibus companies have, in addition, by now begun fully to realise what some of the pioneers found out long ago—that the greater distance over which one runs a service, within reasonable limits, the better it will be proved to pay. Some years ago, in a town where mechanical traction was used on the tramways, there remained one single route operated by horses, and, needless to say, in a very useless and inefficient fashion. A motor omnibus company was asked by the residents of the district to put on a service of omnibuses for this particular route of three miles or so from the centre of the town. The financial results showed a loss of 2d. per omnibus mile, though the horse cars ran empty, and every possible passenger patronised the omnibuses. Apart from London, or any other such centre of congested passenger traffic, the passenger paying 1d. or even 1½d. for his fare is no great source of profit to the motor omnibus. On an average fare basis of 4d. or 5d., however, the long distance motor omnibus with few stops should and does make a substantial income. It is only the crowd of riders continually changing in the London streets that can justify low fares and stops every hundred yards or so, either to set down or pick up, or for traffic reasons. In not every case, therefore, may it be found that the omnibus is an active opponent of the tramcar. London certainly has shown preference for the omnibus, and the reason is chiefly its greater average speed and longer routes, but in most principal provincial towns the sphere of the omnibus is largely outside the town area and in inter-connection of towns, rather than in competing with tramways for suburban traffic.

Makers of motor omnibuses have found themselves for some time past quite fully occupied in building for the home market, but as that field may, by and by, become largely covered, the question arises as to the chances of supplying the requirements of users abroad. We therefore asked the correspondent already alluded to for his opinion of possibilities for business in the less developed parts of Europe, notably throughout the Levant and the Balkan States now that peace appears to reign there. So far as we can ascertain, there are any number of useful openings in this direction for motor vehicles of a strong type, able to withstand very heavy service. It is useless, however, for anyone to think that the surplus omnibuses remaining from the London market can be shipped abroad and operated with satisfaction under other conditions. There are many services already at work in Eastern Europe. For instance, in a country like Montenegro, one will find motor vehicles doing good and regular work, and, indeed, wherever a country has, for reasons of poverty or unsettled politics, been unable to build the railways it requires, there should be scope for motor services for goods as well as passengers. Unfortunately, however, it is just such countries that, as a rule, have only one or two really good road routes, on a national basis; the other roads or highways are too often mere dirt tracks which may not make havoc of tires, but will certainly break springs in record time and lead to more engine and gear troubles than could ever enter into a London driver's worst nightmare.

It is very doubtful whether a country like Turkey or Servia will construct good highways before it decides to extend the railway systems. Too often there is great inducement in the shape of plunder or baksheesh for those who interest themselves in the latter direction. The next generation will be the one to cry out for more and better highway roads. However, the use of private motor cars is already beginning to exercise a great influence in bringing about improved roads, and the heavier vehicle should then benefit. It will have to be specially designed and built to run over vile surfaces, often through streams liable to flood, in fine weather through thick dust, in wet weather through equally thick mud, and at all times to keep on the road and going, for in breakdowns efficient help may be very far away. Nevertheless, there is business to be done, and we advise makers to look for it.

AUGMENTING A TRAMWAY SERVICE.—Licences for four motor omnibuses have been granted to Lancaster Tramways Company for the purpose of augmenting the tramway service between Lancaster and Morecambe.

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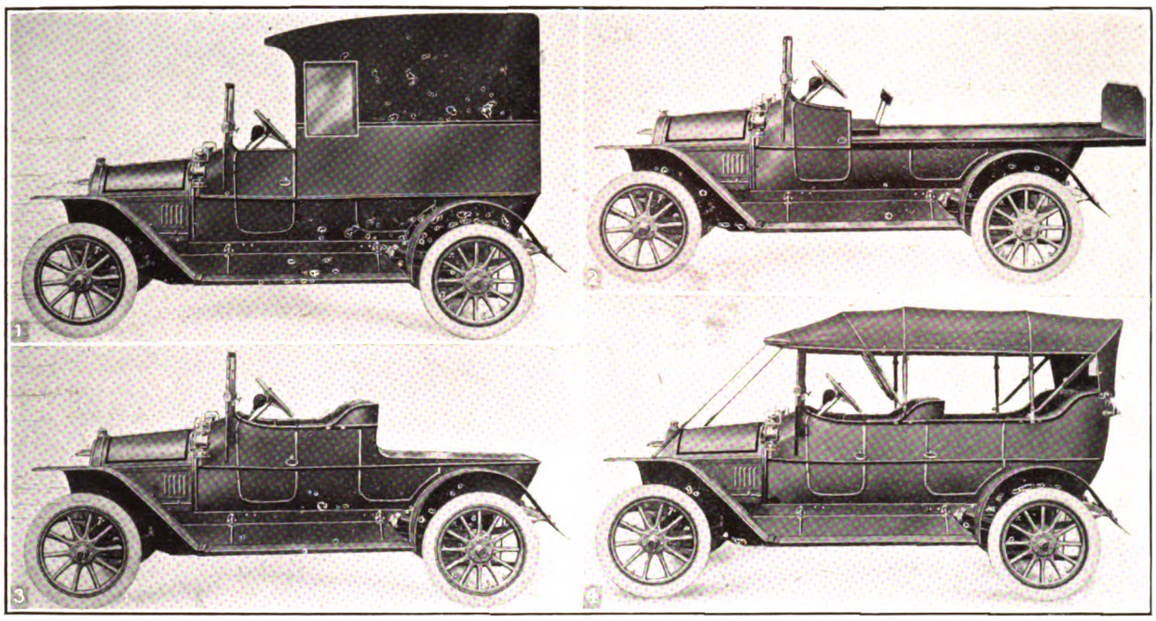
MOTOR TRAFFIC.

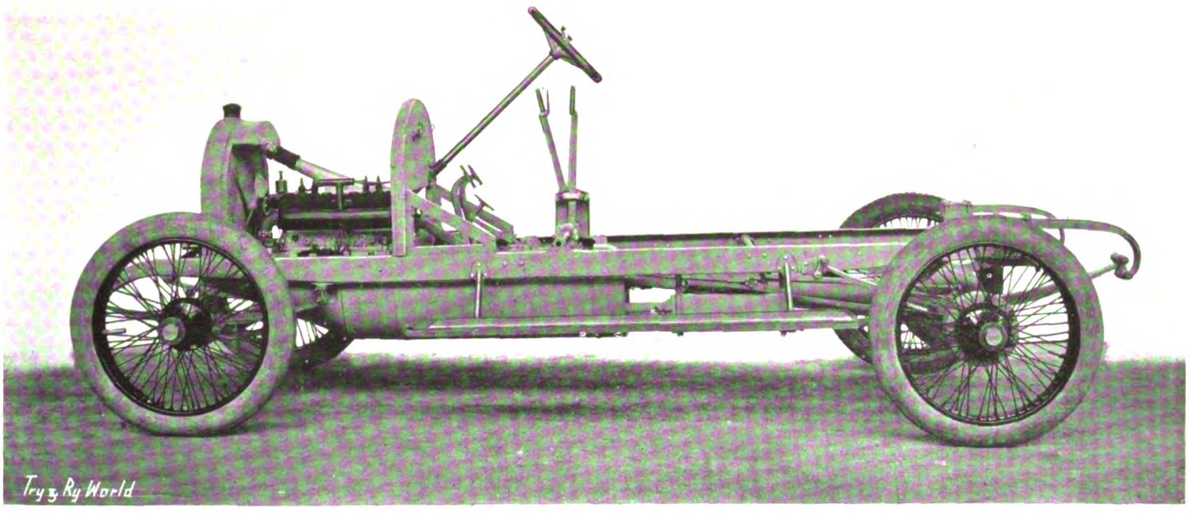
STOEWERS' CONVERTIBLE CARS.

The light commercial vehicle fitted with the Hopkinson patent combination body, which Stoewers, Limited, have recently placed upon the British market, is rapidly finding favour with that large class of motor user whose business calls for a variety of types of vehicles, but with insufficient work for each type of machine to be fully employed. As will be seen from our illustrations, the combination provides for four distinct types, and can be used for either the transport of goods or the conveyance of passengers.



Four Interchangeable Bodies on a Stoewer Chassis.

The base or lower half of the body is permanently fixed to the chassis, the upper half only being separate and detachable. These detachable sections are rigidly secured by specially bevelled transverse bars fixed under the seats of the upper body and adapted to interlock by draw bolts with corresponding bars fixed to the under body, thus entirely eliminating any possibility of movement or wear. By the use of these bars a very large area of contacting and gripping surface is obtained, thus securing rigidity of the detaching sections. Further, these bars serve as a support to the seats; they also greatly stay and strengthen the sides and body of the car. To interchange bodies at the chassis, means the purchase of at least two complete bodies; and it has been found by experience that complete bodies, in addition to their cost, are too cumbersome and bulky to operate and stock—hence the need of the cheaper, quicker, and more efficient method now accomplished by the patent device in question. Owing to the changes being effected in about the centre of the car body, and not at the chassis, it will be seen that the detaching sections are reduced in bulk and weight to a minimum, so that none of the commercial changes require to be entire, which fact very much reduces their cost, and besides, owing to their light weight and small dimensions, they are easily stored.



A Stoewer Chassis.

The transition from one body to another only occupies three minutes, and the converting sections, when in position, are warranted to be as absolutely rigid as a fixed permanent body, will always remain so, and last as long as the car itself. It should also be noticed that the style or design of pleasure car is in no way interfered with.

The chassis, of which we give a side view, is fitted with a 4-cylinder

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MOTOR TRAFFIC.

engine, the cylinders being cast *en bloc*, bore 75 mm., stroke 88 mm. The cam shaft has a silent chain drive. All the valves are interchangeable; they are all placed on one side, and are entirely enclosed. A Bosch high-tension magneto of the new enclosed type is fitted. An efficient system of lubrication is provided, which ensures a correct supply of oil to each of the seven bearings. This is on the forced-feed principle, worked by means of a small gear-driven pump. Two oil filters are fitted to the pump, one on the suction side, and one on the delivery side. Two oil fillers act as vents to the base chamber, while a float working in a glass tube shows the quantity of oil in the base chamber. The three-bearing crank shaft is attached to the top half of the base chamber, and by this arrangement it is possible for the bottom half of the base chamber to be taken down at any time without disturbing the engine. The G.A. patent carburettor is fitted; this has an automatic twin jet and insures efficiency at all speeds. Thermo-syphon water cooling is provided for, an efficient honeycomb radiator being assisted by a chain-driven fan. All the water pipes are of large dimensions.

The gear box gives four speeds forward and a reverse, the drive on the fourth speed being direct from the engine to the driving wheels on the back axle. All gear wheels are made from chrome nickel steel. The shafts are particularly short and run on ball bearings. The change speed control is on the gate principle, the whole of the locking gear and rods being encased in the gear box. A metal to metal expanding brake of very large diameter is fitted immediately behind the gear box, the adjustment being by means of self-locking wing nuts. An improved type of double universal joint is placed between the engine and gear box, and the rear universal joint is enclosed and runs in oil. The cardan shaft and the back axle are completely encased. The back axle is built up of four steel casings, the cardan shaft and differential casing being made complete in two halves and the two side casings bolted to the central casing. This design of axle gives great strength combined with lightness, and forms a neat and thorough mechanical arrangement. The differential is of the bevel type, and the whole of the gears in the back axle run in oil. Ball bearings are used throughout the back axle and differential, and double-thrust ball bearings are used to resist the bevel gear pressures.

The steering is irreversible and of the worm and sector type, the steering column being specially low raked. The foot brake acts on the gear shaft, and the hand brake, which is of the internal expanding compensated type, operates on the rear road wheels, the brake drums being of large diameter. The frame is of pressed steel of channel section. Large semi-ellipitical springs are fitted, those at the back being flexibly suspended by joints at both ends, all the spring bolts having grease cups. Rudge-Whitworth detachable wire wheels with plain pneumatic tyres are fitted. The Stoewer cars are built by Stoewer Brothers, of Stettin, Germany, and have earned a most enviable reputation both in this country and on the Continent. The British representatives are Stoewer (London), Limited, 18, Brompton Road, S.W.

AT THE MOST NORTHERLY POINT IN SCOTLAND.

The vehicle shown below maintains a regular daily service, carrying mail, goods, and passengers between Wick and John O'Groats, the most northerly point in Scotland. The average daily run is about 40 miles over roads that are better described as cart tracks, being for

"Farthest North"—A Halley Omnibus.

the most part of the year soft and muddy, and in many places covered with unrolled metal. The machine, which is a 25 H.P. of the well-known Halley make, has covered since October, 1913, 18,000 miles, and has never made a stop due to engine troubles.

THE DEVELOPMENT OF THE MOTOR COACH.

THE PROGRESS OF EIGHT YEARS ILLUSTRATED.

The accompanying series of photographs, which show motor chars-a-bancs supplied by Messrs. Dennis at intervals during the last eight years, are of exceptional interest as illustrating the complete revolution that has taken place in the design of chars-a-bancs, as a result of the adoption of the motor vehicle. The photographs of two Dennis cars supplied as long ago as 1906 illustrate very clearly the influence of the horse-drawn wagonette and char-a-bancs respectively on the early designs of motors intended for rather similar service. The wagonette arrangement of seating is, of course, deficient, inasmuch as the passengers face inwards, and are therefore in the worst possible position from the point of view of seeing and appreciating the country through which they pass. The char-a-bancs design is much better in this respect, since all the passengers face forward, and those at the rear of the car are elevated above those at the front. However, the seating accommodation, as well as the protection against side winds and weather, left a good deal to be desired in those days.

The next two photographs illustrate some of the very early stages of development. We find the 12-seated char-a-bancs taking the place of the wagonette body, and the back seat, at least, well-shaped with a view to comfort. In the second of this pair of photographs an attempt may be noticed to meet the demand for big carrying capacity, the increase of capacity making it possible to impose a reduced scale of fares without dissipating profits. The natural effect of development along these lines is the provision of accommodation which could lay no claim to luxury.

Some three or four years later marked changes were effected in the design of typical Dennis chars-a-bancs. Admittedly, one of the third pair of photographs still shows a complete lack of provision of side protection, but all the seats are well padded and well rounded. The simplicity of this particular design in some respects was no doubt connected with the fact that the car was designed for alternative use as a lorry by the removal of the detachable seats. In this way it represents an early example of the double-purpose machine which is now very popular, particularly in many North of England districts. The influence of these special requirements on the design is emphasised by comparison with Fig. 6, which shows an earlier type of machine, but one designed purely for passenger service. This car is particularly interesting as being the first built by Messrs. Dennis with the Roi des Belges type of body. The seats are roomy and comfortable, and the side doors adequate, but the general lines are necessarily complicated, and not such as to form a really harmonious design.

Passing on to the last pair of photographs, we witness the development of the torpedo body for char-a-bancs work. Fig. 7 is an early example of this type, and the general lines in this case are only broken by the flat dash and the bonnet. Incidentally, it may be mentioned that the Cape cart hood, partly on account of its appearance, and partly because when it is folded up the car is left completely open, is nowadays far more popular among the patrons of motor coaches than any more permanent form of roof. Fig. 8 shows the latest type of torpedo char-a-bancs. It illustrates the symmetry of the lines of the most recent Dennis productions with tapered bonnet and scuttle dash. It also shows how completely luxury of accommodation can be combined with large carrying capacity, for this car is built to accommodate no less than 30 passengers. It was delivered to its owners, Messrs. Carr, Limited, of Bury, as lately as February last, and represents the third repeat order to Messrs. Dennis from that firm. In this design appearance, combined with comfort and convenience, has been studied in every possible way. For example, the one-man hood, the neat type of steel wheels which have now taken the place of the artillery type, and the general simplicity and elegance in all the lines of the car, are all characteristic of the design.

In taking so prominent a part as they have done in the development of the motor char-a-bancs, Messrs. Dennis have no doubt been greatly assisted by the well-deserved reputation that their worm-driven vehicles have obtained for smooth and quiet running. They are also fortunate in the possession of a particularly well-equipped body-building department.

OMNIBUS LICENCES REFUSED AT GRIMSBY.—The Town Council on February 6 refused to grant an applicatlon for licences to run a motor omnibus service, on the ground that it was not conducive to the safety of the public to have motor omnibuses using the narrow streets already occupied by the tramways.

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MOTOR TRAFFIC.

Fig. 1.—12-Seat Dennis Wagonette supplied to Mr. W Cessford in 1906, and still at work eight years later.

Fig. 2.—One of four 20-Seat Dennis Chars-a-Bancs supplied to Mr. W. Cessford, 1906.

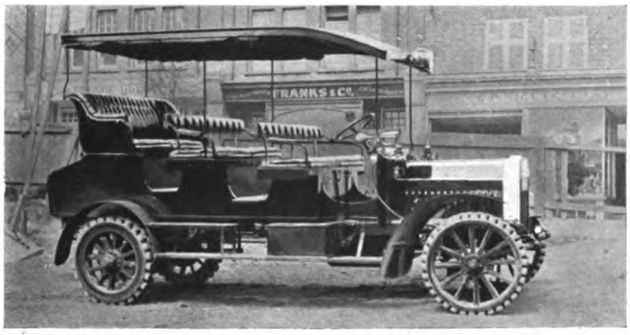

Fig. 3.—12-Seat Dennis specially built for use in the Blue Mountains, New South Wales, 1907.

Fig. 4.—24-Seat Dennis, Representing the Standard Type of Motor Char-a-Bancs, 1907.

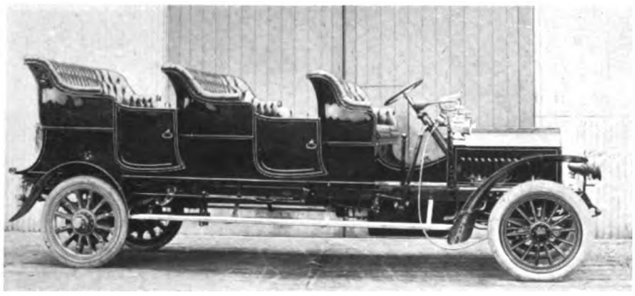

Fig. 5.—First Dennis Char-a-Bancs with Roi des Belges Body, supplied to S. Booker and Sons, 1910.

Fig. 6.—12-Seat Dennis Char-a-Bancs Lorry, with Detachable Seats, built in 1911.

Fig. 7.—An Early Example of the Torpedo Char-a-Bancs. A Dennis 15-Seater, forming a Repeat Order from Mr. Brooks, 1911.

Fig. 8. The Last Word. 30-Seat Dennis Torpedo Char-a-Bancs with Tapered Bonnet and One-Man Hood, recently delivered for service in Bury.

DEVELOPMENT OF THE DENNIS MOTOR COACH.

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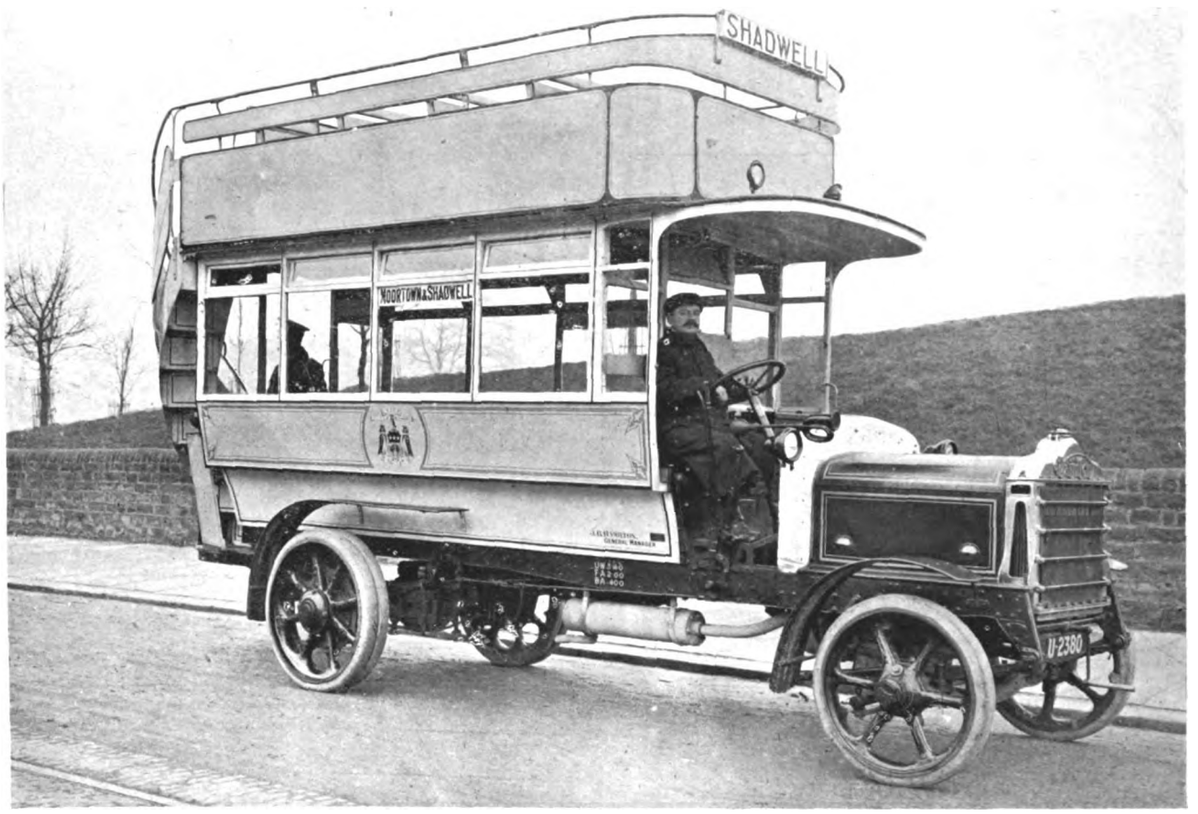
MOTOR TRAFFIC.

DAIMLER OMNIBUS TYPES.

VEHICLES SELECTED BY LEEDS, SHEFFIELD, BRIGHTON, BOURNEMOUTH, AND ALDERSHOT.

Like some other Corporation tramway departments, the Leeds Tramways Committee have decided to make experiments in the running of more than one type of motor omnibus, thus incidentally taking a step that will preclude the possibility of any private company applying for licences to provide the public with this popular form of locomotion. Leeds Corporation have not been backward in adopting an auxiliary public service vehicle, for, along with the Bradford tramways department, they were the first to install railless trolley car traction in this country. That the management did not from the first operate motor omnibuses was due to the circumstance that the Corporation did not possess powers to enable that course to be adopted.

The omission will be remedied this year, for among the clauses in the Leeds Corporation Bill to be heard this session is one to confer authority for running motor omnibuses within the city. Thus the tramways department will be in a position to follow what has very widely become the practice among tramway managers, viz., to use motor omnibuses for the purpose of testing traffic on routes where it is desired to ultimately install railless trolley traction or tramways. There are localities in many cities where the provision of motor omnibus



Daimler Omnibus of Leeds Tramways Department.

Two of the Brighton and Hove Omnibus Company's Fleet.

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facilities may lead to the creation of traffic that would not otherwise be developed, and for this purpose the Daimler double-deck omnibus illustrated on this page is admirably adapted. It will be of interest a year hence to compare the results of its running with the statistics already compiled regarding the operation of the railless trolley system.

Daimler Single-Deck Omnibus at Sheffield.

Another product of the Daimler Works at Coventry is the single-deck omnibus, which has attained popularity in numerous towns and rural districts. The appended photograph depicts four of this type belonging to the Aldershot and District Traction Company. Several attempts have been made during the past decade to provide a tramway system for the chief military training district and garrison town in Great Britain, but the efforts have not been attended with success. By the institution two or three years ago of the motor omnibus service the wants of the town and district have been fully met.

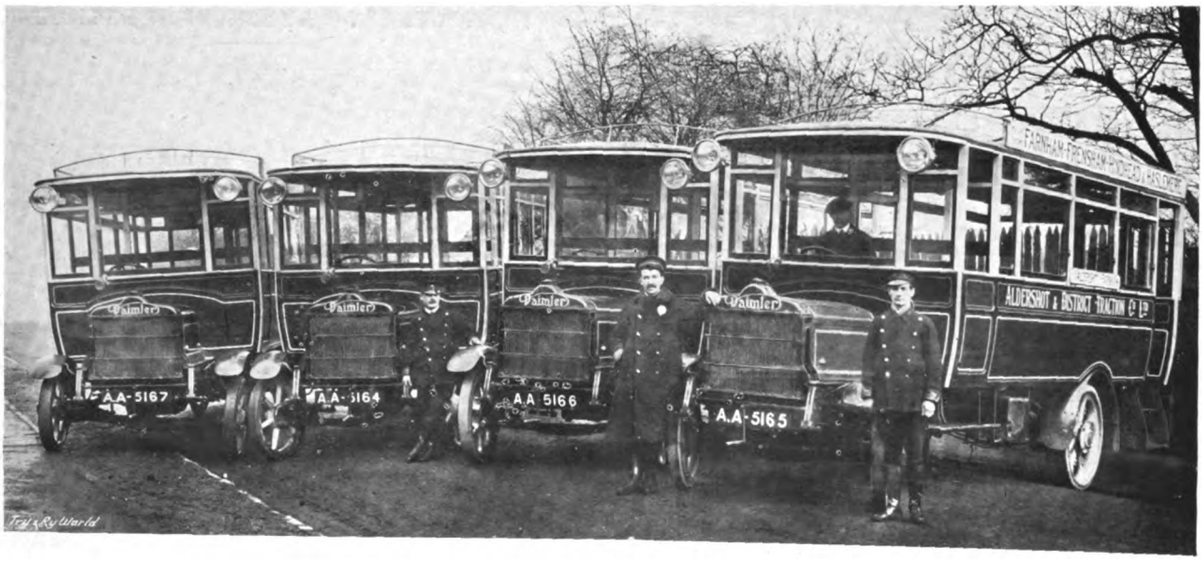
Bournemouth Corporation have placed an order for two Daimler single-deck omnibuses, similar to the single-deck machines supplied to Sheffield Corporation tramways department, which we illustrate. This type of vehicle is increasing in popularity in the provinces, possessing, as it does, several advantages over the double-deck type. It can be used on roads in which the head room is restricted by bridges, arches, or trees, whilst the whole of the passengers are under cover, and it is particularly stable and safe under all conditions of camber.

SOUTH WALES TRANSPORT COMPANY.

IMPORTANT MOVE BY SWANSEA TRAMWAYS COMPANY.

Mr. David James, general manager of the Swansea Tramways Company and of the newly-formed South Wales Transport Company, applied in person, on February 24, to Swansea Watch Committee for licences for a number of vehicles with which the tramway services in the town are to be linked up with the outlying places. Mr. James said the idea was to meet the great public demand for the linking-up of the tramways, and it was proposed to order 18 vehicles at once. They would run from the tramway termini to Skewen and Neath, Clydach and Pontwardawe, Gorsemon, Gowerton, and Llanelly, and to the Mumbles. At night there was an absence of adequate facilities, owing to the poor railway arrangements, for people in the outlying areas to visit places of amusement at Swansea. It had been found impossible to electrify the Mumbles Railway this year, and so it was proposed, as soon as possible, to put six of these cars on the Mumbles Road to augment the existing train services till the electrification takes place, and the public needs entirely met in the summer months. The Mayor pointed out to Mr. James that a better service was required on the Gower Road and Mr. James replied that the company would do everything possible to meet the need. Unanimous assent was given by the committee to the application, and they inspected a 40-H.P. car as a specimen of the type to be used. It accommodates 32 persons, has a normal speed of 18 miles an hour, and cost nearly £900.

INSPECTION OF MOTOR VEHICLES.—Mr. H. Samuel, the new president of the Local Government Board, answered a question as to the steps taken by registering authorities under the Heavy Motor Car Order, 1904, to ascertain whether heavy motor vehicles at registration or when in operation on the highway, complied with the regulations as to weight and width. He was not aware, he said, that the facilities were inadequate.



Omnibuses of the Aldershot and District Traction Company.

OMNIBUSES NEEDED IN LANARKSHIRE.—The directors of the Lanarkshire Tramways Company propose extending their motor omnibus service, and will require additional vehicles for this purpose.

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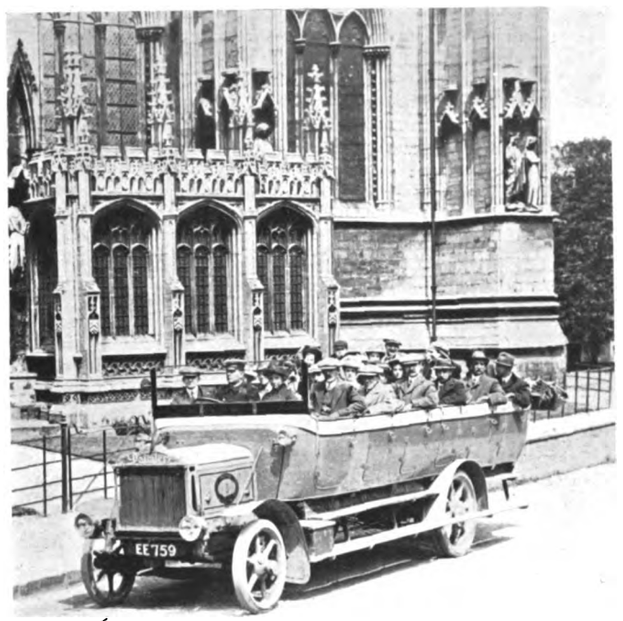
OMNIBUSES TO RELIEVE RUSH TRAFFIC.

During the first week in the present month a number of motor omnibuses were placed in service by Liverpool tramways department. A preliminary announcement stated that the vehicles might possibly be brought into service on routes radiating from Moss Street, which represents the half-way point of the various penny stages to the Pierhead. There were many complaints from intending passengers that all cars passing Moss Street were full during the busy hours, and they have to walk to their destination in consequence.

TRAMWAY COMPANY'S ENTERPRISE.

For several years the Great Grimsby Tramways Company have developed the road motor side of passenger transportation, both within that town and district and for long touring trips. For the latter



Daimler Char-a-bancs at Wells Cathedral.

department the char a-bancs is the machine adopted. The attached photograph shows a party outside Wells Cathedral seated in a Daimler vehicle run by the company.

ROAD MOTORS REQUIRED BY BATH TRAMWAYS COMPANY.—In their report for the past year the Bath Electric Tramways, Limited, state that during the 12 months the company has added four new torpedo cars and two omnibuses to its fleet of motor vehicles, all of which have been doing good service. Certain alterations and improvements have been effected in the older type of omnibuses, which have proved to be most advantageous, the cost thereof being charged against the accumulated revenue of previous years in the sum of £1,776. The foundry belonging to the company continues to give excellent results. As it was absolutely necessary that the company should keep pace with the public demand put upon it in connection with the extension of its torpedo car and omnibus business, the directors acquired the vehicles referred to above, and must obtain still further vehicles to meet the necessities of the growing traffic. The mileage run has increased during the year—in the case of the tramcars by 19,880 miles, and the omnibuses and torpedo cars by 58,898 miles. Receipts amounted to £50,805, an increase of £4,807. Of the available balance of £6,624, the sum of £4,000 had been appropriated to contingencies and renewals account, and the directors recommend that the balance should be carried forward.

BATTERY TRACTOR OPERATING COSTS.

On February 3, 1913, the Pennsylvania Railway of the United States brought into use a battery-driven tractor for hauling goods wagons through the streets of Jersey City. In the ensuing seven months, according to data published in the *Electrical World*, it hauled 4,935 cars, having a total weight of 165,574 tons, a distance of 2,076 miles. The cost of handling these cars with the electric tractor was £934·58, as compared with £1,835·82 had horses been employed, thus representing a return of 64·5 per cent. on the cost of the tractor. Subjoined are the working and maintenance costs:

Cost of maintenance and operation (seven months)	£702 04
Interest at 6 per cent. on £2,680 (seven months) ..	£95·20
Depreciation on £2,680 (less tires and battery, £840, equals £1,840) at 5 per cent. (seven months) ..	£53·67
Depreciation on battery, £640 at 20 per cent. for seven months	£74·67
Total charges for seven months	£925·58
Total charges if horses had been used (4,935 cars × 7·758)	£1,835·82
Saving by electric tractor (seven months)	£910·24
Saving over investment by electric tractor, per cent.	58·5
Saving, including investment (58·5 + 6 per cent.), per cent.	64·5
Cost of service per wagon, (£925·58 ÷ 4,935) ..	3·76s.
Cost of service per ton (£925·58 ÷ 165,524 ..	1·34d.
Average number of wagons per mile	2·4
Cost of service per ton-mile (0·028 × 2·4)	0·067
Total number of wagons handled (4,935 + 2,788) ..	7,723
Number of tons handled per hour	121
Cost of service by electric tractor per working day	£5·57
Cost of service by team per working day	£11·06

ELECTRIC POST-OFFICE VANS IN NEW YORK.

When the parcels post was inaugurated in the United Stares in January, 1912, seven electric battery vans were utilised for the conveyance of bulky matter, and the number has increased to 12. The vehicles and the drivers are leased on a basis of a working day of eight hours of a given 10, after which an extra charge is made. Exclusive of the wages of the attendant who accompanied each van to make the deliveries, the average cost per parcel worked out during the month of December last at 1·05d. For half a dozen years a number of larger electric vans have been in use for mail service in New York, and have frequently been in use twenty-four hours a day.

INSTITUTION OF AUTOMOBILE ENGINEERS.

Appended is a list of the meetings to be held during the month of March:

March 11—Sixth Ordinary General Meeting. Paper by Mr. F. W. Lanchester on "Engine Balancing." Hall of the Institution of Mechanical Engineers, Storey's Gate, S.W.

March 11—Paper before the Coventry graduates on "Hydro-Aeroplanes" by W. E. Boyes. King's Head Hotel, Coventry.

March 12—Paper before the Birmingham graduates on "Self-starters" by W. McWhinney. White Horse Hotel, Birmingham.

March 19—Visit of the Birmingham graduates to the works of Messrs. Avery, Limited.

March 21—Visit of the London graduates to the works of Messrs. D. Napier and Sons, Limited.

March 25—Paper before the Coventry graduates on "Gear Boxes" by D. V. Barrs. King's Head Hotel, Coventry.

March 26—Paper before the Birmingham graduates on "Two-stroke Motors" by W. H. Lyne. White Horse Hotel, Birmingham.

A meeting of the Midland Centre will take place at Birmingham towards the end of March, when Dr. W. R. Ormandy will read a paper on "Lubrication."

Some 70 gentlemen interested in the automobile industry in Scotland met at the Windsor Hotel, Glasgow, on February 20, and resolved to form a branch of the Institution of Automobile Engineers in Scotland. Mr. T. C. Pullinger was elected chairman of the section, and the following gentlemen were elected on the provisional committee: Messrs. J. F. Henderson, L. Bell, G. H. Cutbush, G. Russel, H. Perrot, J. Carlow, W. L. Spence, and W. J. Thomson. All interested are requested to communicate with the hon. secretary, Mr. G. E. McCaw, 63, Kilbowie Road, Clydebank, Glasgow.

OMNIBUS AMALGAMATION AT OXFORD.—Mr. W. R. Morris has arranged, subject to the approval of Oxford Corporation, for the transfer of the motor omnibus licenses, which he holds, to the City of Oxford Electric Tramways, Limited.

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"HALLEY'S" IN CANADA.

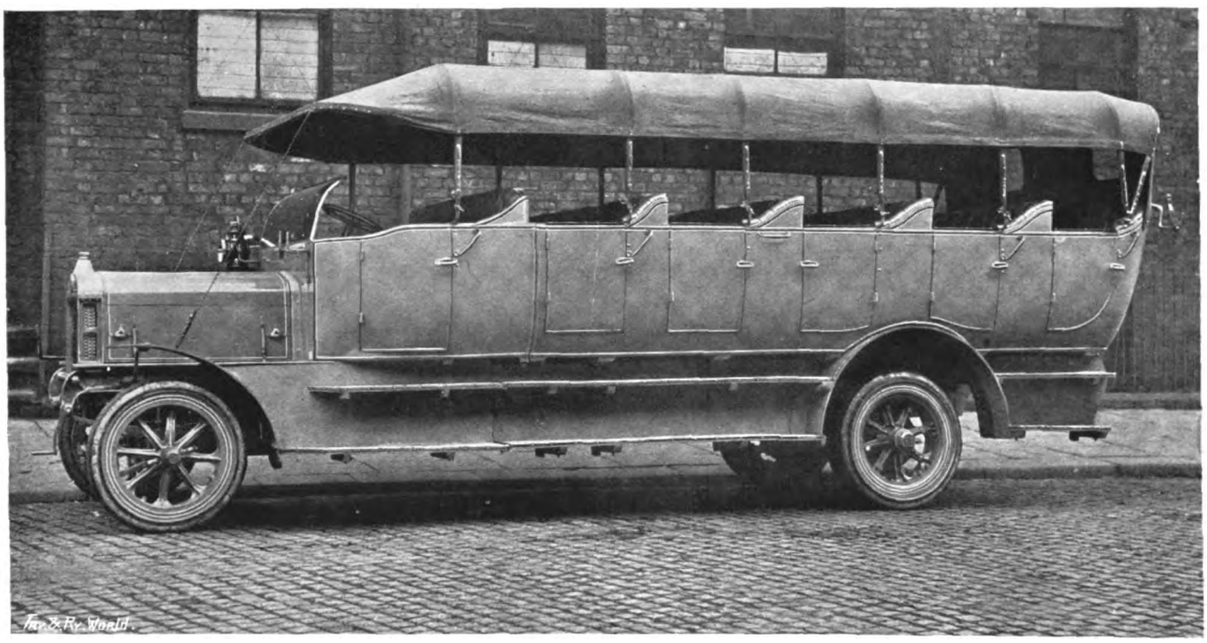
Towards the latter part of last year Halley's Industrial Motors, Limited, formed a company for the sole purpose of attending to their Canadian connection. This new company, styled "Canadian Halley's Motors, Limited," has been registered under the Dominion Government, and is already in full operation with head offices and repair depot at 10, Colborne Street, Montreal. In order to give every facility for developing the Canadian trade, a full range of special models, built particularly to suit Canadian requirements, are now in stock in Montreal, while the company's exhibits at the recent heavy vehicle show held in that city have already received favourable comment in the local press. Full equipment and a big stock of spare parts are already in Montreal, and users in that country will have the same facilities for obtaining repairs as if in Scotland. A capable staff trained in the Halley company's own works at Yoker, will deal with the technical part of the business, under the immediate control of Mr. Chas. Bell, recently the Halley representative in Denmark. As general manager of the Canadian company, Mr. Chas. Pimm (who is well-known in eastern Canada, and who has spent some time in the particular study in the works at Yoker) will be in a position not only to speak authoritatively on the best type of vehicles to be used for the various classes of work in Canada, but his intimate knowledge of Canadian matters will, no doubt, prove of great assistance to potential users in the Dominion.

Branch offices and sub-agents are being established in every city from east to west, the first of these being the agents in British Columbia, Messrs. P. E. Harris and Company, Vancouver, who already have a good connection and run a demonstration "Halley" vehicle.

EAST SURREY TRACTION COMPANY.—A motor omnibus service has been inaugurated by this company between Redhill and Dorking and Dorking and South Holmwood.

TWO HALLEY VEHICLES.

The vehicles exhibited at the recent exhibition in Manchester by Halley's Industrial Motors, Limited, Yoker, Glasgow, to which brief allusion was made in a previous issue, comprised one of their luxurious 28-seated torpedo char-a-bancs, and a 5-ton 40-H.P. latest type platform lorry. Of both these machines illustrations are given below. The former, which is one of a pair built to order from Ogden and Dickman, Limited, Manchester, is a Halley B type chassis of 35-H.P.



Halley 28-Seated Torpedo Char-a-bancs.

fitted with a four-speed gear box, giving a top speed of 19 miles per hour. The wheel base is 13 ft. 10 in., and the track is 4 ft. 11 in. This vehicle constitutes the very last word in char-a-bancs construction. The engine is powerful and yet quiet, the speed is all that can be desired on a vehicle of this type, while the body is an exceptionally roomy and comfortable one; and, although it is not readily noticeable, the whole of the bodywork rearward of the driver's seat is readily removable, and a platform body for the conveyance of goods fits in its place. Messrs. Halley's advise us that they have done a very large business recently in these double purpose vehicles, and there is no doubt that they meet the needs of a great number of users, while it cannot be said that the appearance of the chars-a-bancs as turned out by Messrs. Halley's suffers by being adapted for the dual purposes of passengers and goods.

A Halley Goods Chassis.

The 5-ton vehicle is a repeat order from the Moorhey Carrying Company, of Oldham, and is a particularly fine type of goods vehicle. The engine is of the Halley standard 40-H.P. type, and with the usual four-speed gear box this machine is geared to 13 miles per hour. The wheel base is 15 ft., and the track 5 ft. 4 in., giving a platform area 14 ft. by 6 ft. 6 in., with its double ignition, chain cases, A.T. speedometer, acetylene head light, and entirely closed cab.

An important point in connection with the Halley machines is their simplicity, and it is worthy of note that in the last trials held in this country for commercial motors, the Halley vehicle received the special award for simplicity of construction.

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BRISTOL OMNIBUS EXTENSION.

ADVANTAGES OF THE SINGLE-DECK VEHICLE.

The type of omnibus used by the Bristol Tramways and Carriage Company has attracted much attention from outside. Not only has a request been made by the London General Omnibus Company for plans and permission to build the vehicle designed by Mr. Charles Challenger, and known as the "Composite," but the Bristol Tramways Company have been asked if they could supply a fleet of omnibuses for an important Yorkshire town. The company construct all their omnibuses at the new works at Brislington. So far they have been compelled to utilise all their plant and equipment in supplying their own requirements, and as many as 30 were built during last summer and autumn. Bristol claims to possess a better omnibus as regards comfort, speed, and safety, than any other city. There are over 50 in service, and others are being built as quickly as possible, for Mr. Challenger, the general manager, has in contemplation the opening up of several other country districts, as well as an augmentation of the present services.

There are 15 routes linking up the centre of the city with the suburbs and the rural districts, and the route mileage amounts to 60 miles, or double the mileage of the tramways, and the omnibuses are all working under successful and remunerative conditions. The manager's aim has been to fill all the main thoroughfares that were not provided for by the electric cars, and the company have not yet completed their programme in this respect, as there are several more long country routes which will receive attention as soon as the company can turn out from their works additional vehicles. There are upwards of 50 in service already.

Mr. Challenger states that the company could double the services on summer Saturdays if they had sufficient vehicles; in fact, they generally do double the services on the country routes, and they increased them somewhat on the city routes as well. But it is the country the public make for throughout the summer. The winter service to West Town covers a distance of eight miles, but in the summer it will be extended to the popular glen known as Brockley Combe, passengers being landed at the entrance to the Glen in 55 minutes after leaving the tramways centre. The omnibuses are used to link up during the summer months the tramway services which end on the Bristol side at Brislington, and on the Bath side at Newton St. Loe.

PROVISION FOR FUTURE WORKS EXTENSION.

While tramways cannot be constructed unless there is a sufficient number of available passengers to make the line pay, Mr. Challenger says it is possible to thin down the number of omnibuses for any particular route to the exact requirements. During the last week in 1913 over 109,000 passengers were carried on the various routes, and in the third week in January there were 102,237.

All the original vehicles purchased in 1905-6 have passed out of service, and each one now running was built by the company. Mr. Challenger's son, Mr. G. H. Challenger, who subsequently devoted attention to aviation, had much to do with the designing of the new chassis and engine. For some time double-deck omnibuses were used, but this type has been discarded in favour of the "Composite" single-deck vehicle. Mr. Challenger considers that Bristol is too hilly for the double-deck type, which is not liked by the public. Moreover, it is not so economical, for in wet weather a top-deck car is generally only half filled, whilst in hot weather the inside is almost empty. The improvements effected in the company's vehicles by their own engineers have not only rendered them more popular but reduced the costs of working.

A reference to the development of the road motor vehicle business was made by Sir George White, the chairman, at the annual meeting, which is reported in another column. Sir George stated, in addition, that in the omnibus routes they had tapped a source of revenue which was going to be still further developed in various directions. Their general motor business, that of running pleasure chars-a-bancs, was attended with considerable success, so much that they could see openings over a very much larger area of country, and the necessary vehicles were now being built at their works, ready to take the road when the summer weather began to open up. The report also referred to the motor constructional works at Brislington. When he welcomed the shareholders there in June last, it certainly looked as if they had made provision for many years to come; but really the business seemed to develop by such leaps and bounds that the directors thought it desirable to secure the only unbuilt-upon land anywhere adjoining the works, containing a similar area to that on which the works stood, viz., 4½ acres.

LONDON GENERAL OMNIBUS COMPANY.

The second annual general meeting of the London General Omnibus Company, Limited, was held on February 19, at Electric Railway House, London, Mr. Henry A. Vernet presiding. As already recorded, the total dividend proposed on the ordinary shares for the past year is 18 per cent. The gross receipts were £3,258,197 and expenditure £2,769,826. Depreciation of leases, plant, and machinery, and reserve for renewals and contingencies took £191,614, leaving balance at credit of revenue account £296,757. The balance from the last account was £11,061, and interest and dividend on investments, etc., realised £38,911, making in all £346,729 to be dealt with.

The CHAIRMAN, in moving the adoption of the report, said the charges on the 4½ per cent. first debenture stock and the 5 per cent. cumulative income debenture stock required £95,000. After allowing for items totalling £10,446 there was a balance at the credit of profit and loss account of £241,283. For the last six months of the year the directors recommended the payment of a dividend of 10 per cent. on the shares of the company, which would absorb £115,048, and there was a balance remaining of £34,197. The expenditure on capital account during the year amounted to £424,887. Of this amount £245,407 was required for the purchase of additional motor omnibuses, equipment, plant, etc., and £179,480 for land and buildings for new garages. All the company's omnibuses were now fitted with side life-guards, and in 46 instances these had been instrumental in avoiding what might otherwise have been fatal accidents. Investigation also pointed towards the fact that had it been possible to complete the evidence the guards were efficacious in 16 other instances. The chief engineer (Mr. Iden) and a staff of experts were continuing to experiment with a guard for the front of the omnibuses. The directors would be prepared to pay a substantial sum to any person who would invent a front life-guard which would be satisfactory to the licensing authorities and themselves. The number of fatal accidents was steadily decreasing. Apart from the side-guards, to which he had referred, the improvement was, in their opinion, due to the greater skill shown by the drivers and conductors, and also to a greater degree of caution on the part of the public. The company had built and equipped a training school at Millman Street, Chelsea, where drivers and conductors were put through a most exhaustive system of training. In 1912 one fatal accident occurred for every 443,057 miles run, in 1913 one for every 665,402 miles, and up to February 12 of this year only one fatal accident occurred in 1,020,752 miles run. For the year under review the omnibuses owned or worked by the company carried 676,328,145 passengers, an average of 1,853,000 per day. The average fare per passenger was 1·33d. To illustrate the extraordinary degree of mechanical efficiency at which the omnibuses were worked, their records showed that during 1913 99·8 per cent of the total scheduled mileage was run. In other words, only 0·2 per cent. of the total mileage called for by the schedule was not run because of mechanical failures. This, he ventured to suggest, was a record unequalled by any other large transportation company in the world, and proved that not only was the staff responsible for the repairs of the omnibuses highly efficient and well organised, but that the drivers were equally efficient in handling the vehicles entrusted to their care.

Lieut.-Colonel C. F. COLVILE seconded the resolution, which was carried.

THE LONDON UNDERGROUND.

MAGNITUDE OF THE CONTRIBUTIONS FROM THE OMNIBUS SECTION.

The accounts of the Underground Electric Railways Company of London for 1913 show a divisible balance of £623,838. Interest on the 4½ per cent. 1933 bonds absorbs £84,488, Central London Railway assented stocks £26,830, 6 per cent. first cumulative income debenture stock £76,380, and 6 per cent. income bonds £390,970, leaving £45,170, which it is proposed to carry forward. For the first time the accounts cover a complete year's working. Of a total income of £629,817, only £153,649 was received from the interest in railway companies proper, the principal contributor to the revenue being the holding in the London General Omnibus Company, which yielded £207,086. A sum of £170,000 was derived from the Associated Equipment Company, which was brought into existence to carry out the constructional work necessitated by the omnibus company's rapidly expanding enterprise. The holding of stocks, shares, and other property stands in the balance sheet at £13,593,696. The report says: "The business of the London General Omnibus Company, Limited, continues to expand. The fleet of motor omnibuses was increased during the year, and several new garages were opened. The Associated Equipment Company, Limited, entered into an agreement with the Daimler Company,

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Limited, whereby this company has been appointed the sole manufacturer for the Daimler Company of certain classes of commercial motor chassis. This company, in addition, will continue to manufacture chassis and spare parts for the London General Omnibus Company. In October last the company entered into an agreement with the New Central Omnibus Company for the purchase of its assets. In accordance with the arrangement set forth in the last report, the exchange of the shares formerly held by this company in the London United Tramways, Limited, for shares in the London and Suburban Traction Company, Limited, was duly carried out. The results of the latter company for its first year may be considered as satisfactory."

A LIVERPOOL EXPERIMENT.

It is stated in the report for 1913 of Mr. C. W. Mallins, general manager, Liverpool Corporation Tramways, that two petrol-electric omnibuses, supplied by W. A. Stevens, Limited, were placed in service on the Calderstones Park and Woolton route in November, 1912. The number of passengers carried last year was 295,023, and the receipts were £2,228. The committee on November 21, 1913, decided to order six additional omnibuses of the latest types, viz., two from W. A. Stevens, Limited, two from the Brush Electrical Engineering Company, with Daimler chassis and Brush bodies, and two from Sidney Straker and Squire, Limited. The committee have decided to try the three types for the purpose of ascertaining which is the most suitable for operation in Liverpool.

Although two of the vehicles have been in service for more than a year, the report gives no particulars as to running costs. The route upon which they are used extends from a tramway terminus for nearly a mile and 1,249 yards, and a fare of twopence is charged for the full distance, which is divided into penny stages. The tramways are one of the routes from the Pierhead upon which there is a service of first-class cars. According to the traffic returns for 1913, there were three omnibuses on this route, and they are credited with the following performances: Number of journeys, 12,116; number of passengers, 295,023; miles run, 42,571; average receipts per mile, 1s. 3·07d.; average receipts per journey, 4s. 4¾d.; average receipts per car, £890 18s. 8½d.; total receipts £2,672 16s. 1d. From Woolton inwards omnibuses began running at 8 a.m., continuing every half-hour to 9 a.m., every hour to 1 p.m., and every half-hour to 10-30 p.m. Outwards from Calderstones Park the running times were 8-15 a.m., 8-45, 9-30, and every hour to 12-30 p.m., then 1-15 and every half-hour to 10-45 p.m. The reserve, renewal, and depreciation account includes the following items: Depreciation of two petrol-electric motor omnibuses £253 10s.; sale of disused motor omnibuses, £76 10s. The cost (£1,521) of purchasing the two petrol-electric vehicles was defrayed from the reserve, renewal, and depreciation account, which also provided the sum of £923 for the purchase of the undertaking of the Woolton Motor Omnibus Company, Limited.

Through Tickets on Omnibuses, Tubes, and London United Tramways.—The long-expected issue of through tickets on the Underground Railways, motor omnibus routes, and the London United Tramways, which were promised two years ago as the result of the amalgamation of the three undertakings, is now being carried into effect. On February 1 such tickets were issued between well-known stage points in the south-west and western districts as regards the railways and omnibuses, while similar facilities were also available between the Central London Railway, the London United Tramways, and certain omnibus routes.

Automobile Engineers Visit the Works of W. A. Stevens, Limited.—The London Graduates of the Institution of Automobile Engineers paid one of the most interesting visits in the history of the section on February 21, to the works of Messrs. W. A. Stevens, Limited, Maidstone. The party were received by Mr. Stevens and by Mr. Barnwell, the assistant engineer. The works, which are quite new and are not even yet in full working order, show that plenty of room has been allowed for expansion, although even now a very fine equipment of machine tools is installed. The well-known Stevens-Tilling petrol-electric omnibus was seen in various stages of construction, while an interesting feature was the presence of a number of Hastings surface-contact electric tramcars which were being converted to the petrol-electric system. The engine-testing department provided many matters of interest. The engines are run on town gas and drive dynamos by which the output can be measured, and this output is used to drive the works plant. In addition to this, current is supplied to assist the local Corporation supply to such an extent that even the peak load can be carried without putting in additional generators. The graduates are promised another visit to these works in a year's time, when it is hoped that they will be in full operation.

LONDON TRAFFIC REGULATION.

Stopping Places of Tramcars and Omnibuses.

The London County Council, on February 3, were informed by the Highways Committee of the receipt of a letter from the Home Secretary on the question of stopping places for tramcars and omnibuses, a point in regard to which the Commissioner of Police was empowered by section 4 of the London Cab and Stage Carriage Act, 1907, to give directions. The letter said that in 1912 steps were taken to call meetings of representatives of the London County Council and of other parties concerned, to endeavour to reach an agreement as to the directions to be given under the section above mentioned. The matter was postponed until the Select Committee on Motor Traffic had reported. That Committee, in their report, expressed themselves strongly in favour of this method of dealing with the question. The Home Secretary concurred with the Select Committee on this point. He proposed, therefore, to instruct the Commissioner of Police to invite the various public bodies and companies controlling tramways and omnibuses within the Metropolitan police district to send representatives to New Scotland Yard to confer with representatives of the Commissioner and of the different road authorities, with a view to arrive at an agreement as to the appointment of stopping places.

The Highways Committee, commenting on this letter, said they understood that it was proposed that the conferences should deal only with specific cases. The conferences would be in relation to details and not principles. The Committee thought that the Council should be represented, and the Home Secretary had been so informed. They had appointed their vice chairman (Mr. G. H. Hume), Mr. H. H. Gordon, Mr. Theodore Prestige, and Mr. A. L. C. Fell, the chief officer of tramways, to attend all the conferences and, in addition, in cases in which such a course proved convenient or practicable, it was proposed to arrange for the members of the Council for the electoral division affected by any proposal to be invited to attend the conferences.

The Committee also called attention to the present situation in regard to tramcars and omnibuses at Hammersmith Broadway. Quite apart from the large number of omnibuses allowed to stop in the Broadway, those running between Liverpool Street and Hammersmith which had hitherto passed through the Broadway to Brook Green Road now turned in the Broadway. Forty omnibuses an hour were turned at this place, and the congestion and the risk of accident were thereby very considerably increased. The Council had agreed to contribute £30,000 towards the cost of widening the Broadway (half of which was to be charged to the tramway account). A suggestion had been made that tramcars should not be permitted to stop in the Broadway for the purpose of taking up or setting down passengers, but the committee were of the opinion that that proposal was not reasonable. They recommended that the attention of the Commissioner of Police be drawn to the fact that omnibuses stopped and were turned in the Broadway, and that he be asked to take such action as would minimise the risk of accident to pedestrians and passengers using the tramways. The proposals were approved.

NORWICH OMNIBUS AGREEMENT.

In return for the consent of Norwich Corporation being given to the bill for extensions and alterations and motor omnibus powers, which the local Tramways Company are promoting in the present session, the directors of the company have agreed to carry out certain street improvements, at a cost of £2,100. Omnibuses are not to be used except along routes to be prescribed by the Corporation. Omnibuses, etc., are to form part of the undertaking on purchase by the Corporation. A proposal that the company's liability to pave and maintain so much of the roadway as extends 18 in. beyond the rails of, and on, each side of any tramway, should be extended to 25 in., has been conceded, as has also a suggestion that certain provisions of the 1897 Act should be applied to omnibuses, viz.: (1) The cesser upon notice of the use of carriages in a thronged street; (2) that no advertisements shall be displayed upon any standard pole or carriage. A clause has been inserted providing that the company are to run a "proper and sufficient service of carriages for artisans, mechanics, and daily labourers" at certain hours at fares not exceeding ½d. for every mile or fraction of that distance (the company not being required to take any fare less than 1d.) The company may enter into agreement with the Corporation to supply electricity to the latter body.

Two Edison Accumulator Omnibuses, with seating capacity for 23 passengers, are to be ordered by the Corporation of South Shields. These are the first omnibuses of this kind ordered in Europe.

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MOTOR TRAFFIC.

MOTOR TRAFFIC NOTES.

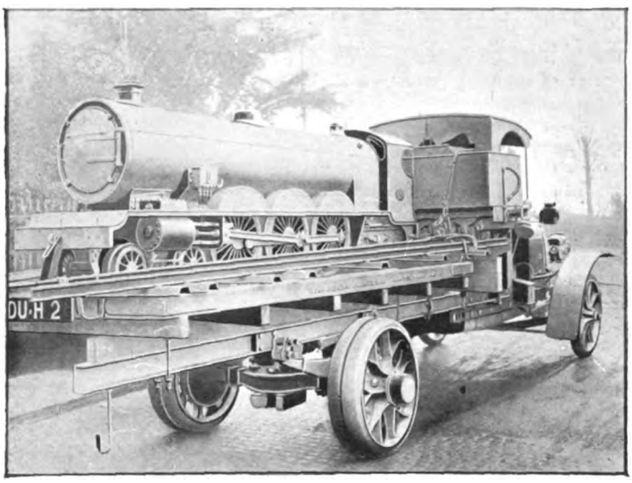
WANTED, A LIFE-GUARD.—The London General Omnibus Company are prepared to pay a substantial sum to anyone who can invent a satisfactory life-guard for the front wheels of motor omnibuses, said the chairman, Mr. H. A. Vernet, at the annual meeting.

MOTOR TRANSPORT COMPANY FOR CALCUTTA.—For the purpose of carrying on in Calcutta and elsewhere in India the business of general carriers, railway and transport agents, and any other profitable business connected therewith, the Calcutta Motor Transport Company has been formed.

SOUTH SHIELDS TO PURCHASE OMNIBUSES.—Authority was given on February 10 to the chairman, vice-chairman, and tramways manager of the South Shields Council to visit London and any other place for the purpose of inquiring into the best type of omnibus to adopt for the service to be instituted from Stanhope Road tramways to the borough boundary at Simonside.

CHESTERFIELD OMNIBUS SERVICES.—The Council have accepted the tender of Mr. J. W. Wildgoose at £321 for an extension of the car shed, and at £464 for roofing the omnibus garage. The omnibus service is to be started during April, and upon the financial result will depend the decision of the Tramways Committee as to what routes are to be selected for railless trolley car traction.

MODEL LOCOMOTIVE CONVEYED ON A MAUDSLAY.—The attached illustration shows a 3-ton lorry constructed by the Maudslay Motor



Company, Limited, of Coventry, conveying the largest model locomotive yet manufactured.

PROPOSED TAX ON ROAD TRAFFIC.—The Roads Improvement Association have considered Clause 23 in the Middlesex County Council (Great West Road) bill, in which power is sought to levy a special tax upon public service traffic using the new road. It was resolved that the clause be opposed, and that witnesses on behalf of the Association attend before the Parliamentary Committees to support the objections.

PROPOSED MUNICIPAL INTER-URBAN OMNIBUS SERVICE.—Representatives of the Blaydon, Ryton, and Wickham Councils, have discussed the question of establishing a municipal motor omnibus service for the three towns. The Northern General Transport Company have informed Ryton Council that serious difficulty was being experienced in securing delivery of motor omnibuses earlier than the end of March or the beginning of April. The company would open an experimental service at the earliest possible date.

OMNIBUSES FOR ABERDEEN SUBURBAN TRAMWAYS COMPANY.—The directors have placed an order for three motor omnibuses, which they hope to have in operation within the next few months. They have also given an order for a new car. The half-yearly report of the company shows a profit of £1,484, making with the amount brought forward £2,453, which, as usual at this time, is carried forward. A new agreement has now been concluded with the Corporation of Aberdeen for the supply of electric energy to the company at a price of 1⅛d. per unit, being a reduction of ⅛d. per unit from the present price.

SHEFFIELD'S APPLICATION FOR MOTOR OMNIBUS POWERS.—The Sheffield Corporation Bill on March 3 was before the Court of Referees of the House of Commons, on the petition of Rotherham Corporation, who sought to be heard against it when before the Select Committee. Mr. Ram, K.C., stated that Sheffield Corporation were already empowered to run omnibuses within the city and along specified routes outside, but this bill proposed to enlarge the outside area and to run along routes not specified. This would enable them to tap traffic which now went through Rotherham. The Court refused the application.

TRAMWAY COMPANY'S HOPES FROM OMNIBUS TRAFFIC.—Mr. J. Mearns, who presided on February 27 at the half-yearly meeting of Aberdeen Suburban Tramways Company, said the traffic returns were steadily increasing, and he hoped that with the new traffic which motor omnibuses they had ordered would bring them, and with the reduction in the price of current which they had got, the returns would be even better for next year. Other developments in view included the extension of the parcels service. A new agreement for running powers had been adjusted with the Corporation Tramways Committee.

MANCHESTER AND MOTOR OMNIBUS POWERS.—The Tramways Committee are considering a project to run omnibuses on a five-mile route embracing Chorlton, Stretford, Urmston, Davyhulme, and Barton Bridge. Residents at Didsbury and Burnage are also petitioning for a service. In the bill promoted by the Corporation clause 25 provides powers to run omnibuses within the city, and along routes outside on which tramways are leased to or over which the Corporation have running powers. The Manchester tramways run into Stockport by way of Heaton Chapel and Heaton Norris. Stockport Tramways Committee have decided that the bill should be opposed.

CAMBRIDGE OMNIBUSES AND ROAD MAINTENANCE.—On the petition of Cambridge Corporation the Chancery Court on February 3 made an order for the compulsory winding up of the Cambridge Horse Tramways Company, in consequence of failure to pay in 1912 the agreed sum of £325 a year for road repairs on the tramway route. For the company it was urged that the Corporation had licensed the omnibuses which caused the reduction in the company's receipts. The petition should not be granted until Parliament had decided what steps should be taken to make omnibuses contribute to road maintenance. The Corporation had refused permission to the company to electrify the tramways. Mr. Justice Astbury, in making the order, said, he could not keep the petition hanging about till Parliament had made up their mind as to contributions by omnibuses to road maintenance.

PETROL-ELECTRIC AND DAIMLER VEHICLES FOR BOURNEMOUTH.—The Bournemouth Tramways Committee reported to the Corporation on March 5 that they had examined and tested on the road a double-deck Tilling-Stevens petrol-electric omnibus and a single-deck Daimler omnibus, and that they subsequently resolved that two of the former type and two of the latter be ordered. The tramways manager submitted the following details showing the cost of the vehicles authorised to be purchased: Two Tilling-Stevens double-deck omnibuses, at per chassis, £585; double-deck omnibus body, special, as per exhibition vehicle, £210; lighting (electric), £35; tires, £80—£910; £1,820 for the two. Two Daimler single-deck omnibuses, at per chassis, £550; single-deck omnibus body to Corporation's specification, £212; lighting (electric), £42 2s. 6d.: accessories, £13 17s. 6d.; tires, £90—£908; £1,816 for the two. Total, £3,636. The difference between this sum and the loan of £4,000 to be expended on spares.

ROTHERHAM COUNCIL HAMPERED BY ROAD RESTRICTIONS.—Replying at a meeting of Rotherham Corporation on the reason why they had applied for a Provisional Order extending the time for the laying down and equipment of trolley vehicles and the running of motor omnibuses in certain districts of the Rotherham Rural Council, Alderman Winter, chairman of the Tramways Committee, said the people of the districts had clamoured to know why the Corporation had failed to meet their obligations to them. The reason was because of agreed clauses which were obtained by the outside authorities holding a pistol at the heads of the Corporation. The estimate for putting the road in order to bear the traffic amounted to over £15,000, and the Rural Council now wished to know whether the Corporation were prepared to meet the outlay, although at the enquiry it was the intention that the Corporation should pay only a portion. The letter from the Rural Council made it prohibitive to attempt to run omnibuses, apart from trackless cars, from Wickersley Lane end to Dinnington. The conditions were more onerous under the Corporation's Act of 1911 than they were in subsequent Acts obtained by other Councils. Every one of the bodies to whom he referred, he said, were placed on better terms than Rotherham had obtained from West Riding Council or Rotherham Rural Council. The Corporation's application for extension of time was not unreasonable. They had only two years to carry out the whole of their works, whereas other authorities had four or five years.

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

BENGAL-DOOARS RAILWAY COMPANY, LTD.

The Directors are prepared to receive tenders for the supply and delivery of :—

(a) 1,150 Pairs Steel Fish-Plates for N.S. 41¼lb. Rails, and 2,177 Pairs Steel Fish-Plates for B.S. 50lb. Rails, and 550 Tons Steel Flat-Footed B.S. 50lb. Rails;

(b) 33,850 Dog-Spikes for N.S. 41¼lb. Rails and 68,600 Dog-Spikes for B.S. 50lb. Rails,

as per specifications to be seen at the Company's offices.

Tenders, addressed to the undersigned, and marked "Tender for Fish-plates and Rails" or "Tender for Dog-spikes," as the case may be, are to be lodged not later than noon on March 24, 1914.

For each specification a fee of 10s. will be charged, which cannot, under any circumstances, be returned.

The Directors do not bind themselves to accept the lowest or any tender.

By order of the Board,
F. J. HORNE,
Secretary.

210-216, Gresham House,
Old Broad Street, London, E.C.,
March 10, 1914.

GREAT NORTHERN RAILWAY COMPANY (IRELAND).

The Directors are prepared to receive tenders for the Replating of an Electric Battery now in use in connection with their Hill of Howth Electric Tramway in accordance with the Company's drawings and specification, copies of which can be obtained upon application to the undersigned on payment of two guineas, which will be refunded on receipt of a *bonâ-fide* tender and the return of the drawings and specification.

Tenders, under cover endorsed "Tender for Electric Battery," should be lodged with the undersigned not later than 10 a.m. on Monday, March 30, 1914.

The Directors do not bind themselves to accept the lowest or any tender.

T. MORRISON,
Secretary.

Secretary's Office,
Amiens Street Terminus, Dublin,
March 11, 1914.

CITY OF COPENHAGEN.

ACCUMULATORS.

The Municipality of Copenhagen require tenders for the delivery of an Accumulator Battery for Traction purposes about 250 kw. (one hour) to a new sub-station.

Specification and conditions of contract may be had on application to "Elektrisk Station, Gothersgade 30, Copenhagen K." on payment of 20 Kr., which sum will be refunded on return of the specifications, etc., accompanied with the tender.

Tenders must be sent to "Direktören for Kœbenhavns Belysningsvaesen," Vognmagergade 8, Kœbenhavn K., not later than 12 o'clock noon, April 6.

CITY OF CARLISLE.

ELECTRICITY DEPARTMENT.

The Corporation of Carlisle invite tenders for the supply of the following Stores, etc., for the year ending March 31, 1915 :—

Schedule 2. (*c*) Lubricating Oils, Greases, etc.
,, 3. (*d*) Cables.
,, 4. (*e*) Transformers.

Specification, with general conditions and form of tender, may be obtained from the undersigned at the Electricity Offices, Victoria Viaduct, Carlisle, upon payment of a deposit of five shillings for each section, which will be returned after the tenders have been adjudicated upon, provided a *bonâ-fide* tender is sent in by the date specified and not withdrawn. Extra copies of each specification may be obtained at the sum of one shilling each, which is not returnable.

Tenders, properly endorsed and sealed with wax, to be sent to the undersigned not later than 9 a.m. on Wednesday, April 1, 1914.

The Corporation do not bind themselves to accept the lowest or any tender, nor will the Corporation pay any cost incurred in tendering.

FREDK. W. PURSE, M.I.E.E., M.I.Mech.E.,
City Electrical Engineer.

Electricity Offices, Victoria Viaduct, Carlisle,
March 11, 1914.

COUNTY BOROUGH OF OLDHAM.

TENDERS FOR STEAM, EXHAUST, DRAIN, ETC. PIPES.

The Oldham Corporation Electricity Committee invite tenders for the supply, erection, and delivery of Steam, Exhaust, and Drain Pipes, Condenser Pipes, etc.

Copies of the specification, general conditions, etc., can be obtained (after Monday next) from Mr. S. Wilmott Newington, Borough Electrical Engineer, Greenhill Electricity Offices, Oldham, on payment of two guineas, which will be returned on receipt of a *bonâ-fide* tender.

Tenders to be sent in not later than noon of Monday, March 23, 1914.

The Committee do not bind themselves to accept the lowest or any tender.

By order, J. H. HALLSWORTH,
Town Clerk.

Town Hall, Oldham,
March 10, 1914.

COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

The Electricity and Tramways Committee of the County Borough of Warrington are prepared to receive tenders for :—

1.—750 kw. Rotary Converter.
2.—E.H.T. Switchboard Panel.

Specifications and forms of tender can be obtained from the undersigned on payment of one guinea for each specification, which will be returned on receipt of a *bonâ-fide* tender. Five shillings will be charged for extra copies of either specification.

Tenders, addressed to the Chairman of the Electricity and Tramways Committee, Town Hall, Warrington, must be sealed with wax, and endorsed "Tender for 750 kw. Rotary Converter" or "E.H.T. Switchboard Panel," as the case may be, and delivered not later than 12 o'clock noon on Tuesday, March 31, 1914.

The lowest or any tender will not necessarily be accepted.

F. V. L. MATHIAS, M.I.E.E.,
Borough Electrical and Tramways Engineer.

Howley, Warrington.

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POSITIONS VACANT.

COUNTY BOROUGH OF SWANSEA.

ELECTRICITY DEPARTMENT.

Applications are invited for the position of Charge Engineer.

Commencing salary £115 per annum, rising by annual increments of £7 10s. to a maximum of £130 per annum.

The systems of supply are three-wire continuous current three-phase 6,000 volts, and traction; and the plant consists of reciprocating engines, turbines, water-tube and Lancashire boilers.

Preference will be given to candidates with experience of similar systems and plant.

Applications, endorsed "Charge Engineer, Electricity Department," stating experience, age, and accompanied by copies of three recent testimonials, to be sent to the undersigned not later than noon on Friday, the 20th instant.

H. Lanc Coath,
Town Clerk.

Guildhall, Swansea.

COUNTY BOROUGH OF WALSALL.

The Corporation of Walsall invite applications for the appointment of Engineer and Manager of their Electricity Undertaking. Commencing salary £500 per annum. The appointment to be subject to three months' notice on either side.

Applications, on forms to be obtained from the undersigned, accompanied by not more than three recent testimonials, are to be sent to me on or before the 3rd April next, endorsed "Electrical Engineer."

Canvassing directly or indirectly will disqualify.

Herbert Lee,
Town Clerk.

Council House, Walsall,
March 10, 1914.

FOREMAN COACH PAINTER.

Wanted, by Corporation Tramways on the South Coast, a Foreman Coach Painter. Wages £2 10s. per week. Must have held similar position, and have a thorough knowledge of car painting. Apply, giving full particulars and enclosing copies of references, to Box No. 161, The Tramway and Railway World, Amberley House, Norfolk Street, Strand, London, W.C.

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THE
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SATURDAY, MARCH 14, 1914.

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MOORGATE STREET, LONDON, E.C.

THE COLLECTION OF TICKETS.

For a long time Mr. Henry Mozley, general manager of Burnley Corporation Tramways, was as a voice crying in the wilderness on the subject of collecting the tickets from passengers before they leave the car. He adopted the plan on the Burnley system for the purpose of securing that every passenger should pay his or her fare, and at various conferences of tramway men he explained how the scheme worked and how successful it was. Mr. Mozley has always been of the opinion that the same system might be adopted on other tramways with highly satisfactory financial results; but in the past his efforts in this direction did not meet with a great deal of success. Tramway managers generally have been ready enough to admit that the Burnley "See that you get your fares" arrangement is highly successful in Burnley, but for one reason or another it was not taken up generally. An argument against it which was frequently put forward was that in a large town with a very heavy tramway traffic the conductor on the car has no time to collect tickets. Conversely, it was said that the conductor is fully occupied in issuing tickets and collecting fares. What particular valid argument could be advanced against the scheme in the case of smaller towns it was not so easy to see. The tramway traffic is fairly heavy in Burnley, and if the collection of tickets is carried out there it should be much easier in towns having a smaller population and a lighter traffic. The adoption of such an arrangement as the pay-as-you-enter system involves a little expenditure; but the collection of tickets from passengers does not, so that the latter scheme, as an entering wedge, should appeal to the smaller towns. It may be thought that in places where the traffic is light the conductors will miss very few fares; but apparently this is a fond delusion. That at least is an inference which may be drawn from some figures just published in connection with Lowestoft Tramways. These lines extend to only about four miles, reckoned as single track. Their gross revenue is some £11,000 a year, and after paying working expenses, interest, and sinking fund there is a deficiency of between £1,000 and £2,000. The financial year for Lowestoft ends on September 30, and it appears that for the five months since Sepember 30 last the tramway receipts amounted to £3,903, as compared with £3,552 for the corresponding period of the previous year. This is an increase of about 10 per cent., and appears to be quite a phenomenon in the tramway annals of Lowestoft. There is nothing to account for it in the way of special events, and the inference is drawn that at least a considerable part of the increase must be due to the fact that during the last five months the system of collecting the tickets from the passengers has been in force. Probably even the most sceptical will admit that the "lifting" of the tickets as passengers leave the cars has something to do with the result. Even if the big cities remain obdurate, it must be worth the while of those responsible for tramways in smaller and medium-sized towns to investigate the case of Lowestoft, to discover all the local details, and consider whether the system of collecting tickets would not be advantageous to them. An increase of 10 per cent. in receipts is not to be laughed at in the case of any tramway undertaking, especially when on the face of it there can be no corresponding increase in expenses. But in the case of some of our smaller undertakings such an increase would be of enormous value, seeing how difficult it is to make some of these undertakings pay their way.

LONDON'S NEED OF HIGHER SPEED.

The Highways Committee of the London County Council are seeking the support of the borough councils for the purpose of applying to the Board of Trade to sanction an increase of speed of their cars to sixteen miles an hour on those portions of route where twelve miles an hour is now permitted. On some sections of the various routes a speed of sixteen miles is authorised, but so far two or three of the councils have expressed themselves as being against a general extension of speed. Islington's rulers suggest that where the sixteen-mile speed is permitted it should be reduced to twelve. Poplar allege that the speed is already excessive in East India Dock Road, and have asked the County Council to apply to the Local Government Board for a reduced speed limit for all self-propelled vehicles in that thoroughfare. A newspaper that has become notorious for its opposition to tramways states that the County Council have refused to submit such an application, "which, of course, would slow down the tramcar as well as other vehicles." As a matter of fact, the tramcars and horse-drawn vehicles would not be affected by any order made under the Motor Car Act. In refusing to apply for the reduced limit the County Council are adhering to what is their general practice, except in special cases. Hammersmith Council are alleged to have replied that tramcars are dangerous, and have again asked that no cars should be allowed to stop in the Broadway. This request is made in spite of the County Council having spent a large sum in widening the thoroughfare in order to link up the line to Shepherd's Bush. The Borough Council appear to have said nothing about the obstruction caused by omnibuses using the

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Broadway as a turning point. A number of reasons may be advanced in support of the Highway Committee's application. Tramcar passengers have long complained of the slow speed during the evening period of heavy traffic. Something will be done to remedy this now that the Council are seeking powers to compel slow-moving vehicles to keep to the side of the road, and to cause owners of motor vehicles drawing trail cars to place a guard on the latter with means of communicating with the driver. During the afternoon and early evening the cars occupy fifty minutes in traversing, for instance, a seven and a half mile route, whereas up to ten o'clock or later in the morning the journey is done in forty minutes. Even at this rate the speed works out at only a little over twelve miles an hour, although on a mile or so the cars are authorised to run at sixteen miles an hour. The competition of the omnibuses affords another reason in support of the application. Under the Heavy Motor Car Order these vehicles are restricted to a speed of twelve miles, but even on the sixteen miles an hour portions of the tramways they are to be found outstripping the cars. Not many months ago the police were engaged in timing the two classes of conveyance in South-East London, many convictions being obtained against the drivers for running at speeds alleged to be at the rate of from sixteen to twenty miles. The police cannot be blamed for enforcing the law, but in taking that course they are acting in opposition to the view which is always put forward on behalf of the Commissioner at motor car speed limit inquiries, viz., that a restriction of speed produces traffic congestion. For that reason the police should support the application of the Council, if their opinion is sought by the Board of Trade. The increased speed limit ought to follow as the natural outcome of the impending regulation of slow-moving vehicles. Fast running on rails is less dangerous than it is in the case of railless vehicles; and in view of the brake tests which the Chief Officer of the tramways carried out a few years ago for the Board of Trade, no question as to the adequacy of the brakes ought to arise. That tramway traffic is less dangerous than motor omnibus traffic is shown by the return issued this week, and given elsewhere in this issue, showing the number of accidents in London in which the two classes of vehicles were concerned during the past two years.

BELFAST TRAMWAYS AND PROFIT-SHARING.

Irish Secretary's Offer to Introduce a Bill.

In the House of Commons on March 11 Lord R. Cecil asked the Chief Secretary for Ireland whether the Local Government Board auditor had surcharged the members of the Belfast Corporation the bonus paid to their tramway employees; whether this had put an end to the profit-sharing scheme there in force; under what statute the auditor decided the payments were illegal; and whether the Government contemplated legislation to remedy this state of things.

Mr. Birrell (Chief Secretary for Ireland): The Local Government Board auditor surcharged salaries and wages to the amount of £2,800 paid on May 4, 1912, to the staff of the tramways department in anticipation of the profits estimated as likely to be earned in respect of the year ended March 31, 1913. The Local Government Board have no official information as to the second paragraph of the question. The auditor's reason for making the surcharge was that the payments in question were not authorised by law. As regards the last paragraph, it is open to the Corporation to initiate any such legislation if they so desire. I may add that the surcharges in question were remitted by the Board on appeal.

Lord R. Cecil asked whether the Chief Secretary would consider the desirability of a change in the general law so as to permit municipalities to enforce such a scheme where they thought it desirable—(hear, hear)—and whether he was aware the destruction of this scheme had been a great disappointment to the tramwaymen.

The Chief Secretary said that personally he should be exceedingly glad to see such an alteration in the law made, and if the noble lord could give him any satisfaction on that subject he should be proud to be the author of the Bill.

DEARNE VALLEY TRAMWAYS SCHEME.

The hearing was continued on March 6 at the offices of the Light Railway Commissioners, London, of the opposition to the application of the Urban District Councils of Wombwell, Wath-on-Dearne, Bolton-on-Dearne, and Thurnscoe for powers to construct and work a light railway, eighteen miles in length, at an estimated capital cost of £150,000.

Mr. W. B. Cownie, managing director of the Mexborough and Swinton Tramways Company, explained the objection taken to the scheme by that company, who held a Parliamentary concession for a railless trolley installation from Mexborough to Manvers Main, which they hoped to equip by the end of the year. The materials and cars had been ordered. The promoters of this application proposed to construct a light railway over the whole of that route, despite the fact that the Mexborough and Swinton Company had expended between £3,000 and £4,000 on obtaining the concession. His estimate of the possibilities of the scheme was that its net revenue would be £6,900, with which to meet sinking fund charges of £9,750. The district proposed to be served could be effectively dealt with by a railless route, such as the circular route originally proposed by the promoters, but it simply would not stand a tramway.

On behalf of the Midland Railway Company and the Midland and North Eastern Companies Joint, it was maintained that the scheme would set up competition and would make a deficit, so that the Midland, as considerable ratepayers, would be prejudicially affected. Mr. Munro, counsel for the companies, suggested that the Commissioners had no jurisdiction in this matter, for this was for all practical purposes a tramway, and not a light railway.

Mr. A. W. A. Chivers, inspecting officer to the British Electrical Federation, Limited, the undertakers of the Barnsley Light Railways, said he found there was no real need for tramway extensions in the neighbourhood of Barnsley. They had for some time past been running motor omnibus services between Barnsley, Wombwell, and West Melton as a method of testing the traffic demands of the district. It was not a big service, but it was sufficient.

Continuing his evidence on March 9, Mr. Chivers estimated that in the Dearne Valley scheme the loss in the year's working would be £6,390.

Mr. William Clow, the superintendent of the Great Central Railway, gave particulars of the railway service between Mexborough and Barnsley and Stairfoot and Barnsley. During last year the local bookings from stations within the area to stations on the Great Central numbered 1,340,442. Between Swinton and Mexborough the bookings were 655,586. In other cases they had found that tramways had abstracted traffic from their lines up to a distance of five miles. The number of passengers carried in the area between Mexborough and Barnsley, five miles or less, amounted to 511,078.—In reply to counsel, the witness said he thought that history would repeat itself if the tramways were constructed, and that the railway company would lose the whole of their passengers. It was imperative in the interests of safety and of efficient working that there should be a bridge in place of the crossing proposed at Wath Staithes.

Mr. E. A. Clear, assistant manager of the Great Central Railway, said that at Sheffield his company had lost 34.5 of its total passenger traffic between Sheffield, Tinsley, and Rotherham because of tramway competition.

Mr. J. B. Ball, engineer-in-chief of the Great Central Railway, said if the brakes of a car at rest failed at the top of the incline, it would cross the Staithes crossing at the rate of 12 miles an hour.

On March 10, the tenth and last day of the inquiry, the West Riding County Council asked for an obligation to be placed on the promoters to provide a minimum width of road of 27 feet for the single track, and 33 feet for the double track, and also to pave with granite throughout. The Sheffield and South Yorkshire Navigation Company asked that the liability for maintenance and repair of their bridges should be transferred to the tramway undertakers.

Replying for the promoters, Mr. Ram, K.C., stated that since the suggestion from the chairman that terms should be arranged with the Mexborough Company for the right to construct over their railless route from Mexborough to Manvers Main, authorised last year, the promoters had offered them £1,000, which had been rejected.

The chairman announced that it was possible the Commission might have an intention of sanctioning a part only of the scheme, and in that event notice of the intention would be given to the local authorities promoting, before the report of the Commission went to the Board of Trade.

ACCIDENTS DUE TO VEHICLES IN LONDON.

A return was issued this week showing the number of accidents in which various classes of vehicle were concerned in London during the past two years. As will be seen, motor omnibuses were responsible for 190 deaths and tramway cars for 58 deaths in 1913:—

	1913.	1912.
Motor omnibuses (fatal)	190	182
(Non-fatal)	3,583	2,828
Tramcars (fatal)	58	27
(Non-fatal)	3,053	2,231
Other vehicles (fatal)	187	171
(Non-fatal)	7,174	6,316

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L.C.C. TRAMWAY MATTERS.

THE NEW TURBINES.

At last Tuesday's meeting of the London County Council the Highways Committee referred to the fact that on May 6 last year the Council accepted a tender by the British Westinghouse Company, amounting to £50,532, with an additional sum of £4.000 to cover the cost of transformers, in respect of the manufacture and erection of two 8,000 kw. steam turbine generators and auxiliaries required for the Greenwich power station. The company had now asked for payment on account of £12,883, being approximately 50 per cent. of the value of the first turbo-generator. The company pointed out that owing to the condition of the station, and to the fact that the foundations and other building work were not yet completed, they had been unable to deliver the whole of the first turbine, and that by request portions of it had to be kept back, the value of the work actually delivered being about £11,500. The contract with the company provided that the first payment should be made when the whole of the work had been delivered, but in the circumstances the Committee thought that a special interim payment of £10,000 might be made in view of the very satisfactory progress which the company had made with the work, provided that the plant was duly insured at the works, and that the whole of it was marked as being the property of the Council.

A NEW JUNCTION LINE.

The Committee had under consideration the question of improving tramway communication between Chelsea, Clapham Junction, and Clapham Road. At present there was a car service between Clapham Junction and King's Road, Chelsea, a distance of 1 mile 1,313 yards. It was very difficult to make a short service such as this remunerative, especially as it was overlapped at both ends by a frequent service of motor omnibuses. If a double junction were installed leading eastwards from Falcon Road into Lavender Hill, a service of cars could be instituted from Chelsea to Clapham Road. The Battersea Borough Council were prepared to consent to the installation of the junction line, subject to certain conditions as to details, and the Committee were advised that the conditions were reasonable, and might be agreed to. The total expenditure was estimated at £3,866, including £2.000 for special work, to be obtained from Hadfield's Steel Foundry Company, and £200 for rails and fastenings. It was proposed that the installation should be carried out by the staff of the tramway department.

The two reports referred to above were adopted.

SLOW MOVING TRAFFIC TO KEEP TO THE KERB.

On the recommendation of the Local Government Committee the Council adopted a by-law to apply generally throughout London, providing that every person driving any vehicle moving at a slow pace should, as far as practicable, keep the vehicle on the left side of the street and close to the kerb, and that every person offending against the by-law should be liable to a penalty not exceeding 40s. The Local Government Committee in reporting on the matter said that they had for some time been considering the question of the Council making a by-law under section 23 of the Municipal Corporations Act, 1882, and section 10 of the Local Government Act, 1888, dealing with obstruction to traffic caused by slow moving vehicles. The need for a by-law had long been recognised. As far back as 1898 the Commissioner of Metropolitan Police issued a circular stating that his attention had been drawn to the manner in which heavy carts and wagons were driven along the centre of the streets, thereby causing obstruction to all lighter traffic, and that the police had been instructed to direct drivers of heavy vehicles to keep to the near side as far as possible. The Royal Commission on London Traffic in their report stated that all slow vehicles should be required to keep as close as practicable to the kerb. The recent Select Committee on motor traffic also expressed the opinion that a by-law dealing with the matter should be immediately passed. The Local Government Committee had communicated with the Home Secretary, who suggested that the by-law should apply to a limited number of carefully selected streets only, but he had now intimated his willingness to agree to a by-law to apply generally throughout London.

COST OF STREET IMPROVEMENTS.

One of the recommendations contained in a report by the Special Committee on Procedure was that the Special Committee on the allocation of the cost of street improvements along tramway routes should not be reappointed, but that the duty of advising the Council in this matter should be entrusted to the Improvements Committee, and that the Highways Committee should be entitled to report to the Council concurrently with the Improvements Committee when they so desired.

Consideration of this proposal was postponed.

GRID RHEOSTATS AND TROLLEY HEADS.

The Council adopted the recommendation of the Highways Committee for the purchase of 100 sets of unbreakable grid rheostats from the Electro-Mechanical Brake Company, of West Bromwich. Additional particulars will be found in our general news column.

The Council also approved the purchase of 150 trolley heads with booms from Messrs. Brecknell, Munro and Rogers.

THE NEW TRAIL CARS.

Mr. J. D. Gilbert asked what progress was being made with the provision of trail cars on South London routes; whether any were on order, and if so when would they be ready for use.

Mr. G. H. Hume replied that the working drawings for the new trailers were well advanced, and he anticipated that an order would be placed for some cars about the end of July. The routes must be approved by the Board of Trade; application had already been made, but official sanction had not yet been received for extension to other routes. Consideration would be given as to the advisability of placing the first cars on the Brixton and Streatham routes.

YORK AUDITORS' CRITICISM.

The accounts of the York Corporation tramways for the past year show a net profit of £2,710, after making allowances for the payment of interest and sinking fund on loans. The professional auditors, in their annual report, state that in their last report they dealt at considerable length with the subject of depreciation in connection with the electricity and tramways undertakings, and also characterised as unjustifiable the contributions made in relief of rates by those departments in 1911-12. They note with regret that, in the accounts under review, the Finance Committee have not considered it necessary either to recognise the claims of depreciation or to discontinue the contributions made in relief of rates. They point out that the amount provided for depreciation and sinking fund by 95 of the principal municipal and other tramways undertakings in the United Kingdom during the year 1912 represents £2.62 per £100 of capital employed therein, whereas the corresponding figures for the York undertaking were for 1912 £1.26, and for 1913 £1.31. A comparison between their sinking fund instalments and the amounts allowed for depreciation by the Board of Inland Revenue in assessing the income-tax liability of the tramway department gave the following results:—1910-11, sinking fund, £994; revenue allowance, £3,549; 1911-12, sinking fund, £1,551; revenue allowance, £3,487; and it would be observed that even the revenue allowance fell short of the total charge for depreciation and sinking fund suggested as necessary in their (the auditors') last report. The report also states that further recognition of the inadequacy of sinking fund instalments by the Local Government Board was indicated at an inquiry held during the year in connection with an application by the Leeds Corporation to borrow further capital for electricity purposes.

The auditors state in conclusion:—"The question has also occupied the attention of the tramway general manager and professional auditor of the Coventry Corporation during this year. After an exhaustive inquiry as to possible future requirements they recommend, in the course of a comprehensive report, further provision for renewals, owing to the fact that the sinking fund instalments are inadequate. The report also emphasises the point that heavy expenditure will otherwise fall upon the rates for the year in which it is incurred."

At a meeting of the Corporation on March 9, Councillor Sessions, vice-chairman of the Electricity and Tramways Committee, said he would give an assurance that the matter would not be shelved.

THE TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION.

ANNUAL MEETING AND DINNER.

The annual dinner of this Association was held on Friday, March 6, at the Trocadero Restaurant, London, and was, as usual, an enjoyable and successful occasion. Over 250 members and guests attended, and the Rt. Hon. Viscount Chilston, the new president of the Association, presided for the first time. The Association's annual dinners are comparatively informal gatherings, and are popular with the members as giving them an opportunity of meeting one another socially and coming into closer touch with the work which is carried on throughout the year by the Council and secretary. Among the speakers after dinner were the president, Alderman H. Linsley of Salford (president of the Municipal Tramways Association), Mr. Henry England, Mr. J. M. Henderson, M.P., and the Hon. Arthur Stanley.

At the annual meeting which preceded the dinner the chairman, the Hon. Arthur Stanley, reviewed the work of the year. The balance-sheet showed that financially the Association is in a stronger position than ever before. Receipts are well above current expenditure, and all expenses in connection with the appeal to the House of Lords in the rating case have been met by special contributions.

MISCELLANEOUS NEWS AND NOTES.

New Cars for Newcastle-on-Tyne.—The Corporation have agreed to apply for sanction to borrow £12,240 for the purpose of acquiring 15 double-deck top-covered tramcars.

Proposed Increase of Speed in London.—Application is being made by the London County Council to the Board of Trade for permission to increase the maximum speeds on the same routes as motor omnibuses from 12 to 16 miles an hour.

More Cars for Dundee.—Dundee Tramways Committee have at present four cars on order, and they have decided to order four additional cars, and tenders for these are to be invited. The price of the four cars already ordered was about £900 each.

Offer of an Underground Railway System to Chicago.—It is reported that Norton Griffiths and Co., of London, have offered, in conjunction with W. H. Brown and Co., of New York, to organise an operating company, with $25,000,000 capital, to build a system of underground railways in Chicago. It is proposed that 55 per cent. of the profits should go to the city and 45 per cent. to the company. The fare is not to exceed five cents.

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Rate Relief at South Shields.—The Council have adopted a recommendation by the Tramways Committee for setting aside £1,700, equal to 1d. in the pound, from the profits of the tramways for the relief of the rates.

Stretford Prefers Tramways.—The Parliamentary Committee of Stretford Urban Council have refused the offer of Manchester Tramways Committee to run a service of motor omnibuses through the town in lieu of the tramways and light railways scheme authorised in 1903 and 1906.

Underground Railway for Vienna.—A proposal is to be submitted by French companies for the construction of an underground railway in Vienna. In the event of the promoters not being able to raise a loan in Paris, it is stated that German and Austrian companies will take up the scheme.

Sequel to Syndicalism at Leeds.—It was stated in connection with a concert given on March 11 in support of the men displaced by the recent strike of municipal employees that there are 700 men in receipt of "strike pay" at the rate of 12s. 6d. per week. The organisers of the concert were the paviors who have been displaced by a reorganisation in the highways department.

Lenient Treatment of a Conductor.—A London County Council tramcar conductor was charged at Greenwich Police Court with stealing 100 penny tickets from a fellow-conductor's box at New Cross depot. An inspector found that some of the tickets had been issued on the prisoner's car, and 85 were in the man's possession. Prisoner, who bore a 20 years' good character, said it was a sudden temptation, and Mr. Symmons, saying he would believe that that was so, placed him on probation for 12 months.

Against Discount Tickets.—Acting upon the report of Mr. J. S. D. Moffit, general manager, West Ham Tramways Committee have again advised the Council not to act on a suggestion made by a member that tickets should be issued in packets at a discount. Books of tickets, at their face value, have been available for a number of years on the tramways, but there has been little or no demand for them. Return fare tickets, however, are readily taken up, and these, he says, are of more service to the community and value to the department than discount tickets.

Imperial Exchequer and Main Road Maintenance.—Mr. H. Samuel, the new President of the Local Government Board, in presiding on March 9 at the first of a series of conferences on arterial roads in Greater London, said the important thing was that in any town-planning scheme regard should be had to the probable future lines of roads. In regard to finance, the situation was likely to be altered in the very near future by the assumption by the Imperial Exchequer of a very considerable part of the cost of main roads. A committee of surveyors was appointed to go into the matter.

Unbreakable Grid Rheostats.—The Highways Committee of the London County Council propose gradually to substitute for the cast grid rheostat at present installed on the Council's cars an improved type of rheostat manufactured by the Electro Mechanical Brake Company. In this type the resistance grids are formed of rectangular section wire of great strength. The experience of the Council's tramway officers has proved that these rheostats are not only immune from accidental fracture, as occasionally happens in the case of the cast form of rheostat grid, but they also require less attention on the part of the tramways staff. This improved type of grid rheostat is a patented article, and the London County Council at their meeting on Tuesday authorised the Highways Committee to arrange for 100 car sets to be obtained from the makers, the Electro Mechanical Brake Company of West Bromwich. The expenditure will amount to £812 10s.

Fatality Attributed to a Wrong Service Number.—Now that service numbers are being introduced on tramway systems a lesson is to be learnt from a fatality to a London County Council regulator who died in hospital as the result of being crushed by two cars in New Cross Road. At the inquest a conductor of a Victoria to Lee Green car stated that at New Cross Gate he was ordered to run to Woolwich. He had no indicator for Greenwich or Woolwich; therefore the front of the car was left blank, but at the rear "Greenwich" was shown. He told the driver that the indicator on the front was blank. Near the Granby publichouse in New Cross Road, where there was a pointsman, the car was turned on to the metals leading to Lewisham High Road, and had just taken them, when someone shouted that a man was down.—The Coroner: Could you not have got a Woolwich indicator as you passed the depôt?—Witness: We are not allowed to leave our cars.—Replying to Mr. Brewer (for the driver), witness said that seeing that the indicator on the front was blank, the pointsman should have inquired the destination of the car, which was travelling very slowly.—The pointsman said that when turning a car he judged by the service number which way it was going. He noticed the blank indicator and the service number "48," which indicated it was a Lee car. He accordingly pulled the points over for it to enter Lewisham High Road. It was not unusual for a car to come along with the indicator blank.—The motorman gave evidence that when a route was changed it was his duty to stand fast until the pointsman directed him. As witness approached to take the points for Woolwich the regulator walked in the same direction as the car was going. Suddenly the points were set for Lewisham High Road, which caused the car to go that route, a collision being nearly caused. He afterwards saw the regulator lying in the roadway.—By Mr. Brewer: If the points had not been moved his car would not have touched the man.—The conductor (recalled) was asked why the number was not changed when the indicator was left blank, to which he replied that he did not receive orders.—The jury returned a verdict of "Accidental Death," and expressed the opinion that the accident was due to the wrong service number.

CONTRACTS AND ORDERS.

Newcastle-on-Tyne Council have placed a contract with C. A. Parsons, Limited, for the supply of a turbine, at £8,170.

Thornton and Company have been awarded a contract for supplying waterproof clothing for the electrical staff of the Belfast tramways.

Bournemouth Council have placed orders for two Tilling-Stevens petrol-electric double-deck omnibuses and two Daimler single-deck omnibuses.

Battery-Driven Omnibuses for South Shields.—The Tramways Committee have reported in favour of purchasing two Edison electric omnibuses with motor-generator and switchgear, at a total cost of £2,504.

Wolverhampton Council have accepted the following tenders:—United Electric Car Company, fixing six top covers to cars; W. Hayward and Sons, steel work for bunkers for boiler-house extension; Belliss and Morcom, Limited, repair of reciprocating engine plant.

Bradford Council have accepted the following tenders:—North Eastern Steel Company, 800 tons steel girder tramrails, £6 6s. per ton; Thermit, Limited, 800 welding portions required for welding rail joints, 19s. 6d. per portion, less 5 per cent.; C. H. Spencer, trolley bases for trolley vehicle cars, £370.

London County Council have given orders as follow:—Hadfield's Steel Foundry Company, special trackwork for tramway junction at Falcon Road and Lavender Hill, £2,000; Brecknell, Munro and Rogers, 150 uninsulated trolley heads with booms, £195; Electro Mechanical Brake Company, 100 car sets of unbreakable grid rheostats, £812 10s.

British Thomson-Houston Company have received a contract to supply Exeter Council with a 1,000 kilowatt high pressure steam turbo-alternator, at the price of £4,211. The new plant is rendered necessary owing to the increasing demands upon the power station and, in particular, the additional requirements of the tramway undertaking owing to the additional cars about to be put upon the system.

Sheffield Council have placed contracts as subjoined:—G. Heathcote and Co., constructional steelwork for extensions to boiler-house, £12,350; Wellerman Bros., additions to Jobson Road transformer sub-station, £198, and Chapel Lane sub-station, £258; Wolseley Car Company, motor wagon, £550; Electric Construction Company, three feeder panels, £148 12s.; Stirling Boiler Company, re-tubing two Stirling boilers, £703, supply and fixing of two superheaters, £320.

Yarmouth Council have accepted the following tenders:—John Baker and Co. (Rotherham), Limited, 40 steel tyres at 34s. 6d. each, finished, machined, and delivered; C. and J. Webb and Co., Limited, 90 tunics and pairs of trousers for motormen and conductors at £1 13s. per suit, for chief inspector £2 6s. 6d., for inspectors £2 4s.; Yarmouth Stores, caps at 2s. 6d., for inspectors at 6s. 9d.; C. A. Campling, Limited, for tickets at 2½d. per 1,000 and 10d. per 1,000 with the advertising rights.

West Ham Council have accepted tenders for annual supplies as appended:—Davies, Kent and Stewart, and J. H. Tucker and Co., Baxter and Caunter, Falk, Stadelmann and Co., and Field Bros. and Co., Edison and Swan United Electric Light Company, J. and H. Grevener, E. Dewhurst and General Electric Company, electrical fittings and accessories; Gillespie and Beales and Armorduct Manufacturing Company, cables. The contract of the British Westinghouse Company for transformers has been extended for two years from April 1 and the contract with the Fuller Electrical Company for a further year.

Tilling-Stevens Petrol-Electric Vehicles.—W. A. Stevens, Limited, 26, Victoria Street, Westminster, have received since January 1 over eighty orders for Tilling-Stevens petrol-electric vehicles. Among the orders are included forty complete single-deck omnibuses for the Birmingham and Midland Motor 'Bus Company, Limited, and five vehicles for the Maidstone and District Motor Services, Limited. Other orders include those from the Liverpool, Edinburgh, Southend, and Bournemouth Corporation Tramways, besides three repeat orders from the British Arc Welding Company, Limited, and a further vehicle for H.M. War Department. In addition to these English orders, W. A. Stevens, Limited, have also received orders from Pretoria and Durban municipalities. The firm are also filling orders for a fleet of two-ton vehicles, as well as a four-ton petrol-electric vehicle for the British Petroleum Company, Limited.

PERSONAL.

Mr. W. M. Rogerson, borough electrical engineer at Halifax, has received £100 increase to his salary of £600.

Mr. A. S. Barnard, borough electrical engineer to Walsall Council, has resigned that appointment, and a successor is to be advertised for.

Mr. T. G. Richardson, of Bradford, has been appointed manager of the Colne and Trawden Light Railway Company, at a commencing salary of £225. Mr. Richardson has been assistant to Mr. C. J. Spencer, general manager of the Bradford Corporation tramways.

Alderman T. Perrin, J.P., of Hyde, has been elected chairman of Stalybridge, Hyde, Mossley, and Dukinfield Joint Tramways and Electricity Board to fill the vacancy created by the death of Councillor J. Ridyard, J.P. A resolution has been passed recording the members' sense of the loss they have sustained, and conveying to the relatives of the late chairman their sincere sympathy. Alderman H. Sykes, of Mossley, succeeds Alderman Perrin in the vice-chair.

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Mr. Tierney, manager of Blessington Steam Tramways Company, has been appointed a director of the company, and will continue the management of the tramways. The appointment was made by the board consequent upon a report presented by Mr. Tierney, stating that the experience of the past two years had shown him that the work did not call for his entire attention. He had prepared plans for reorganisation, but the chairman, Mr. R. S. Guinness, stated that owing to the legislative and unfortunate conditions with which baronial guaranteed lines are encircled no solution to the problem had yet been found, nor, in his opinion, would be found except by Act of Parliament. The net profit for the past half-year was £244, as against £98 for the corresponding period in 1912.

Mr. Robert Hammond, consulting engineer, who was one of the opposition witnesses called at the inquiry by the Light Railway Commissioners into the Dearne Valley tramways scheme, gave his evidence on March 5. The chairman (the Hon. A. E. Gathorne Hardy) congratulated him on the manner in which he had given his evidence. Mr. Hammond remarked he was pleased to be freed from further attendance, adding, "I was married at a quarter to ten this morning, and I am now going to have the wedding breakfast at half-past three." (Applause.) In cross-examining Mr. Hammond counsel said: Have you sometimes been a prophet of misfortune? Did you not give evidence that Aberdare was going to be a terrible failure?—I did not put it so strongly as that.—Do you not know it is a great success?—I have not seen the Board of Trade returns yet.

Mr. George Westinghouse, the inventor of the Westinghouse brake and founder of the Westinghouse Electric Company, of Pittsburg, U.S.A., died on March 12 at New York. Mr. Westinghouse was born in 1846 and he became assistant engineer in the U.S. Navy in 1864, and held the post until 1865, when he invented a device for replacing derailed steam cars. Three years later Mr. Westinghouse patented his invention of the air brake. He built the first ten great dynamos at Niagara and for the elevated and subway roads in New York and the Metropolitan Railway in London. He also founded in various countries the great engineering works which bear his name, including the British Electrical and Manufacturing Company whose works are at Manchester.

Mr. Walter Chipper, traffic manager of the York Corporation tramways, died suddenly from heart disease while in bed on March 10. Mr. Chipper, who was 54 years of age, went to York about eight years ago as manager of the old horse tramcars, and on the substitution of the electric tramways he was appointed traffic manager under Mr. J. W. Hame, the general manager. He had previously been for many years manager of the tramways at Woolwich, where he began his career. He was highly esteemed at York, and took great interest in the promotion of recreation for the employees. He was vice-president of the Tramways Band, which was formed last year.

FINANCIAL REPORTS AND MEETINGS.

Proposed Capital of 1914 Traction Bills.—Appended are the estimates of the proposed expenditure under Bills deposited for the present session of Parliament relating to traction and electricity schemes:—Railways and canals, £12,357,433; tramways, railless traction and motor omnibuses, £1,044,481; electricity supply, £425,067.

Llanelly and District Electric Lighting and Traction Company.—The accounts for 1913 show a divisible balance of £9,179, after providing for debenture interest, and it is proposed to pay the final dividend on the preference shares, transfer to general reserve £1,000, reserve for depreciation £1,000, and renewals account £1,500, carrying forward £2,079.

The British Electrical Federation.—The traffic statement for the week ended March 6, 1914, shows that the receipts from tramways and railways amounted to £30,387, as compared with £30,802 in the corresponding week last year, and from omnibuses £12,940, as compared with £3,180, making a total of £52,336, as compared with £30,991. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year the receipts show an increase of £2,455 upon the week.

Fife Tramways, Light and Power Company.—Mr. W. Low, presiding at the annual meeting, said the earnings from the Dunfermline and District Tramways Company during the year paid over to the company as dividends and management fees amounted to £15,020, compared with £12,200 for the year 1912. There was growth in traffic on all lines, and on certain sections, if the increase continued, it would be desirable to consider doubling portions of the track. The directors proposed at an early date to issue preference shares with a view to paying off loans contracted to meet the expenditure on extensions. This would leave the company free to issue debentures for future developments, such as the tramway to Rosyth Naval Base and the development of the power company's business. Resolutions were passed increasing the capital from £300,000 to £400,000 by the creation of 50,000 preference shares and 50,000 ordinary shares.

Para Electric Railways Company.—Mr. Tollett Holt, presiding at the ninth ordinary meeting in London on February 27, said that in the past year the total gross receipts derived from working the company's properties suffered a reduction of 2.4 per cent., to £299,925, and the operating expenses 1.8 per cent., to £164,262, the ratio of expenses to receipts working out at 54.8 per cent., as compared with 54 per cent. in the previous year, exchange having remained more or less constant. After making all necessary provision and allowing for the interim dividend there was a balance remaining of £48,305, from which the directors recommended the payment of a final dividend of 3 per cent. on the preference shares, making 6 per cent. for the year, and 5 per cent. on the ordinary shares, making 10 per cent. for the year, leaving £19,205 to carry forward. Unless a great improvement in trade took place on the Amazon it might not be possible or wise to recommend the same high rate for the current year.

WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended March 7 amounted to £225,104, or £12,533 more than in the corresponding week last year, while the track mileage was 2,863, or 24 more than for the corresponding week. The receipts were at the rate of £78 12s. 6d. per track mile, an increase of £3 15s. per mile as compared with last year.

COPPER AND ALUMINIUM MARKET.

March 13, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton:—

	Friday, March 13.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	63 0 0 ..	64 2 6 ..	64 15 0
" " (three months)	63 10 0 ..	64 12 6 ..	65 7 6
Electrolytic Copper—bars or ingots ..	65 15 0 ..	66 10 0 ..	69 5 0
Aluminium—bars or ingots	83 0 0 ..	83 0 0 ..	87 10 0

COAL MARKET.

March 13, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows:—

	Friday, March 13.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	
Best Admiralty Welsh (large)	23 6 ..	23 6 ..	24 9 ..	Owing to the miners' strike there were no quotations.
Best Seconds	23 0 ..	23 0 ..	24 3 ..	
Ordinary Drys	20 6 ..	21 0 ..	23 0 ..	
Best Washed Nuts ..	21 0 ..	21 0 ..	21 6 ..	
Best Washed Peas	19 6 ..	19 6 ..	20 0 ..	
Cardiff, f.o.b.—				
Best Admiralty (large) ..	19 0 ..	19 0 ..	19 9 ..	
Best Seconds	18 6 ..	18 6 ..	19 3 ..	
Ordinary Drys	16 0 ..	16 6 ..	18 0 ..	
Best Washed Nuts	16 6 ..	16 6 ..	16 6 ..	
Best Washed Peas	15 0 ..	15 0 ..	15 0 ..	
Newcastle, f.o.b.—				
Best Steams	14 0 ..	14 0 ..	15 6 ..	
Best Seconds	11 6 ..	12 0 ..	14 0 ..	
Smalls	7 9 ..	6 9 ..	10 9 ..	

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregate. Wks.	Aggregate. 1913-4.	Increase or Dec.
Anglo-Argentine	Mar. 4	£56,226	£58,629	9	£513,648	+ £19,687
Auckland (28 days)	Feb. 13	20,117	23,552	34	159,090	— 439
Ballarat and Bendigo	Jan.	5,169	5,075	42	30,650	— 818
Brazilian St. Rly. Mirs.	Jan.	46,268	54,689	26	319,153	+ 54,032
Brazilian Traction	Mar. 7	92,404	94,832	10	949,260	+ 65,482
Brisbane	Feb.	22,860	25,260	8	53,590	+ 5,920
British Columbia $	Jan.	713,271	777,102	31	5,330,828	+ 336 733
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacroze	Feb.	40,824	40,377	34	356,923	+ 8,140
Calcutta Rs.	Mar. 7	67,166	70,006	9	6,86,668	+ 32,208
Cape Town	Feb.	...	13,342	...	...	...
Carthagena & Herreria	Feb.	3,053	2,919	8	5,695	— 682
Cordoba	Jan.	11,869	12,735	43	133,055	+ 11,904
East India	Feb.	1,622	1,701	30	13,518	+ 516
Kalgoorlie	Dec.	3,206	2,907	52	34,510	— 8,300
La Plata	Feb.	4,942	4,766	8	10,062	— 455
Lima	Sept.	22,660	34,110	39	300,647	+ 23,783
Lisbon Mirs.	Sept.	...	144,538	...	...	...
Madras (14 days) Rs.	Feb. 28	22,078	23,055	8	109,932	+ 9,346
Melbourne	Dec.	...	69,000	...	...	...
Mexico $	Jan.	561,635	579,361	4	285,348	— 6,088
Montevideo	Feb.	34,368	35,8 5	17	137,901	+ 1,363
Para	Mar. 8	4,399	3,627	14	48,023	— 9,656
Port Elizabeth	Feb.	...	3,510	...	...	...
Shanghai $	Mar. 4	20,753	25,000	9	214,800	+ 36,884
Singapore $	Mar. 7	11,200	12,544	9	121,117	+ 7,799
Toronto $	Jan.	776,928	847,945	4	847,945	+ 71,017
Winnipeg $	Jan.	351,497	382,670	4	382,670	+ 31,173

DICK, KERR & CO.,
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TRAMWAYS & LIGHT RAILWAYS
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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1913-4.	Increase or Dec.
Aberdeen Corporation..	Mar. 4	£1,451	£1,550	+ £99	40	£64,134	+ £3,598
Accrington Corp.....	,, 4	494	533	+ 39	48	27,610	+ 2,401
Ayr Corporation	,, 7	204	241	+ 37	42	15,553	+ 2,253
Bath Electric	,, 4	633	745	+ 112	9	6,339	+ 100
Birkenhead Corp.	,, 8	1,144	1,210	+ 66	49	63,301	+ 5,713
Birmingham Corp.	,, 7	11,341	12,328	+ 987	49	584,550	+ 49,229
Blackburn Corporation	,, 4	1,035	1,195	+ 130	49	63,905	+ 5,297
Blackpool Corporation	,, 5	726	788	+ 62	48	82,058	+ 12,658
Bolton Corporation	,, 8	2,417	2,607	+ 190	49	133,655	+ 7,407
Bournemouth Corp.....	,, 11	1,628	1,644	+ 16	49	99,631	+ 9,702
Bradford Corporation...	,, 7	5,305	5,866	+ 561	49	288,820	+ 18,236
Brighton Corporation...	,, 8	788	781	— 7	49	51,907	+ 3,104
Bristol	,, 6	6,895	7,583	+ 688	9½	68,285	+ 4,737
British Elec. Federatn.	,, 6	89,991	52,836	*	...	...	...
Burnley Corporation ...	,, 7	1,449	1,570	+ 21	49	82,769	+ 8,317
Burton-on-Trent Corp.	,, 8	256	285	+ 29	49	14,418	+ 778
Bury Corporation.....	,, 8	1,267	1,308	+ 41	49	65,701	+ 2,477
Cardiff Corporation.....	Feb. 21	2,250	2,579	+ 329	47	127,457	+ 11,879
Chatham and District..	Mar. 5	815	835	+ 20	9	7,309	— 273
Chesterfield Corp.	,, 5	240	260	+ 20	48	12,594	+ 352
Colne & Trawden.....	,, 7	232	231	— 1	9	2,356	+ 101
Cork Electric.....	,, 5	442	447	+ 5	9	4 023	+ 25
Croydon Corporation ...	Feb. 27	1,404	1,496	+ 92	47	77,763	— 6,012
Darlington Corporation	Mar. 7	228	248	+ 19	49	12 199	+ 1 019
Derby Corporation	,, 7	901	958	+ 57	49	47,876	+ 4,286
Dover Corporation	,, 7	198	198	Nil	49	11,729	+ 98
Dublin & Lucan	,, 6	119	114	— 5	9	1,038	— 21
Dublin United	,, 6	5,512	5,455	— 57	10	48,164	— 2,333
Dundee City	,, 2	1,196	1,264	+ 68	43	54,837	+ 3,726
East Ham Corporation	,, 7	1,099	1,049	+ 50	43	50,891	— 2,378
Exeter Corporation	,, 6	278	296	+ 18	49	16,446	+ 752
Gearless Motor 'Buses.	,, 7	...	441	...	10	4.252	...
Glasgow Corporation ...	,, 7	19,822	20,850	+ 1,028	40	817,118	+ 57,863
Glossop(U.Elec.Supply)	,, 7	119	120	+ 1	10	1.195	— 5
Halifax Corporation ...	,, 8	1,789	1,903	+ 118	48	100,947	+ 3,893
Hastings & District.....	,, 5	720	801	+ 81	9	6,264	— 56
Huddersfield Corp.	,, 7	1,997	2,135	+ 138	49	104,314	+ 5,155
Hull Corporation	,, 7	3,079	3,303	+ 133	48	155,139	+ 7,938
Ilford U.D.C.	,, 7	426	455	+ 29	48	21,945	— 850
Ilkeston Corporation ...	,, 11	119	125	+ 6	50	6,555	+ 893
Ipswich Corporation ...	,, 7	361	378	+ 17	49	21,923	+ 752
Isle of Thanet	,, 7	299	333	+ 34	23	7,666	+ 615
Kilmarnock Corp.	,, 7	154	165	+ 11	42	7,397	+ 482
Lanarkshire	,, 5	1,504	1,806	+ 302	9	16,633	+ 2,102
Lancashire United	,, 4	1,363	1,538	+ 175	9	13,815	+ 1,863
Leeds City	,, 7	7,859	8,071	+ 212	49	396,229	+ 16,611
Leicester Corporation...	,, 7	2,637	2,813	+ 176	10	26,138	+ 1,516
Leith Corporation	,, 7	623	649	+ 26	42	29,830	+ 1,428
Leyton U.D.C.	Feb. 12	1,120	1,204	+ 84	45½	60,703	+ 40
Liverpool Corporation..	Mar. 7	12,143	12,792	+ 649	9	119,697	+ 6,281
Llandudno & Colwyn B.	,, 6	165	163	— 2	14	2.101	+ 2
London County Council	,, 4	40,716	42,569	+ 1,853	47	2,038,273	+ 14,911
London Gnl. Omnibus..	,, 7	56,106	56,733	+ 627	10	544,377	+ 4 828
London United	,, 6	5,477	5,846	+ 369	10	50.078	+ 1,047
Lowestoft Corporation	,, 7	130	151	+ 21	22	4.054	+ 372
Maidstone Corporation	,, 5	166	177	+ 11	49	9,610	+ 639
Manchester Corp.....	,, 7	16,621	17,358	+ 737	49	857,039	+ 36,903
Met. Elec. Trys.	,, 6	8,628	9,040	+ 412	10	77,945	+ 224
Nelson Corporation.....	,, 7	174	184	+ 10	49	10.154	+ 564
N'castle-on-Tyne Corp.	,, 7	4,615	4,998	+ 383	49	241,245	+ 21,776
Newport (Mon.) Corp....	,, 7	737	746	+ 9	49	37,545	+ 2,549
New St. Helens & Dist...	,, 4	735	769	+ 34	36	23,049	+ 2,656
Northampton Corp	,, 6	510	536	+ 26	49	27,912	+ 1,642
Nottingham Corp.	,, 5	3,181	3,245	+ 64	49½	161,931	+ 7,048
Oldham Corporation ...	,, 8	1,921	2.115	+ 194	50	109,918	+ 7,596
Portsmouth Corp.....	,, 7	1,778	1,952	+ 174	49	108,837	+ 7,304
Preston Corporation ...	,, 4	795	823	+ 28	49	43.050	+ 2,632
Provincial	,, 7	1,622	1,679	+ 57	22	38,538	+ 2,173
Reading Corporation ...	,, 5	583	648	+ 65	48	33,666	+ 2,393
Rochdale Corporation ..	,, 7	1,427	1,468	+ 41	49	77,721	+ 3,165
Rotherham Corp.....	,, 11	872	896	+ 26	49	49,658	+ 9,827
Salford Corporation ...	,, 9	4,758	5,064	+ 305	49	255.759	+ 11,953
Sheffield Corporation...	,, 8	7,065	7,611	+ 546	50	367,815	+ 26,653
Southampton Corp.....	,, 4	1,110	1,158	+ 48	48	63,154	+ 3,420
Southend-on-Sea Corp.	,, 4	573	723	+ 149	49	44,690	+ 7,719
South Met. Trys.	,, 6	734	1,065	+ 331	10	9,137	+ 2,569
South Shields Corp.....	,, 7	680	683	+ 58	49	35,163	+ 4.045
Sunderland Corp.....	,, 8	1.327	1.355	+ 28	49	70,445	+ 6,279
Sunderland District ...	,, 4	519	554	+ 35	18	10.238	+ 1,150
Swindon Corporation ...	,, 4	139	152	+ 13	48	7,979	+ 445
Trys. (M.E.T.) 'Buses	,, 7	1,400	8,638	+ 7,238	10	77.075	...
Tyneside Trys. & Tmrds	,, 4	454	590	+ 86	9	4,231	+ 160
Wallasey Corporation ...	,, 7	1,092	1,098	+ 76	49	58,913	+ 5,339
Walsall Corporation ...	,, 7	607	631	+ 20	10	5 802	+ 182
Walthamstow U.D.C....	,, 7	660	733	+ 73	43	36,316	+ 1,559
Warrington Corp	Feb. 26	424	423	— 2	48	21,153	+ 412
West Ham Corporation	Mar. 5	2,598	2,725	+ 127	48	131,761	+ 4,266
Wigan Corporation	,, 5	1,429	1,491	+ 62	48½	72,355	+ 6,502
Wolverhampton Corp ..	,, 11	989	1,033	+ 44	50	53,500	+ 2,678
Yorkshire (W. Riding)	,, 8	1,302	1,385	+ 83	10	14,248	+ 1,195

* From such of the services as were working both last year and this year the receipts show an increase of £2,455 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London.....	Mar. 7	£5,186	£5,312	+ £126	10	£51,842	— £2,909
City and South London	,, 7	2,839	2,787	— 52	10	28,511	— 1,956
Liverpool Overhead.....	,, 8	1,590	1,575	— 15	10	16,412	+ 499
London Electric.....	,, 7	14.160	14,650	+ 490	10	146,485	— 5
Mersey	,, 7	2.255	2,312	+ 43	10	23.666	+ 22
Metropolitan	,, 8	15,919	17.544	+ 1,625	10	178,952	+ 15,587
Metropolitan District...	,, 7	12,892	13.054	+ 162	10	132.107	+ 170

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AMBERLEY HOUSE, NORFOLK ST., W.C.

TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, March 10.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	70½ — 72½
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	...	4½ — 5½
5	Do. 5½% Cum. 2nd Pref.	...	4½ — 4¾
100	Do. 4% Deb. Stk. Red.	— ½	99½ — 94½
100	Do. 4½% Deb. Stk. Red.	...	97 — 100
100	Do. 5% Deb. Stk. Red.	...	96½ — 98½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 — 106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅛ — ¼
1	Do. 5% Cum. Pref	...	½ — ¾
100	Do. 4½% 1st. Mort. Deb. Stock, Red.	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	...	86 — 88
10	Blackpool and Fleetwood Tramroad Co.	...	14 — 15
	Bombay Elec. Supply and Trams. Co., Ord.	...	13½ — 14½
10	Do. do. 6% Cum. Pref.	...	10¾ — 11½
100	Do. do. 4½% Db. Stk. Rd.	...	94½ — 96½
$100	Brazilian Traction Light and Power Co. Lim.	— 4½	82½ — 84½
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	...	7½ — 8½
5	Do. do. 5% Cum. Pref	...	4⅞ — 5⅛
100	Do. do. 4½% 1st Deb Stock, Red. ...	...	98 —101
10	Bristol Tramways and Carriage Co.	...	7 — 7¼
10	Do. do. 4% Cum. Pref.	...	7 — 7⅛
100	Do. do. 4% Deb. Stock	...	100 —103
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	— 3½	113 —117
100	Do. Pref. Ord. Stock	— 1	106 —109
100	Do. 5% Cum. Perpetual Pref. Stock.....	— 2	101 —104
100	Do. 4½% 1st Mort. Debs.	...	98 —101
40	Do. 4½% Vancouver Power Debs.	...	94 — 98
100	Do. 4½% Perpetual Cons. Deb. Stk.	...	— —
100	British Elec. Traction Co., Lim., 6% Cum. Pref.....	— 2½	93½ — 95½ xd
100	Do. 7% Non-Cum. Pref.	...	89 — 92
10	Do. 6% Pref. Ord. Non-Cum.	...	56 — 59
100	Do. Deferred Ord. Stock	...	15½ — 17½
100	Do. 5% Perpetual Debenture Stock.....	...	6½ — 8½
100	Do. 4½% Second Debenture Stock, Red	...	95 — 98
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	80 — 83
100	Buenos Ayres Lacrose Trams. Co., Stg. 5% 1st Mrt. Deb.	...	73 — 78
5	Calcutta Tramways Co., Limited, Ord.	...	100 —102
5	Do do. 5% Cum. Pref.	...	6¼ — 6½
100	Do. do. 4½% 1st Deb. Stock, Red.	...	5 — 5¼
1	Cape Electric Tramways, Ld., ...	...	96 — 99
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	⅝ — ¾
100	Do. 5% Debs., Red.	...	3 — 3½
5	City of Buenos Ayres Trams. Co. (1904), Lim.	...	88 — 91
100	Do. 4% Debenture Stock Red, 1985	...	5¼ — 5½
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. ...	...	91 — 96
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	— 3	98 — 98
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	90 — 93
10	Dublin United Trams. Co. (1896) Lim. Ord.	— ⅛	— 6⅞
10	Do. do. 6% Pref.	— ⅛	— 11⅛
100	Do. do. "A" Red.	...	— 12⅛
100	Do. do. Deb. Stock "B" Red. ...	...	— 81
10	Gateshead & Dist Trys. Co., Ord.	...	— 79
10/-	Hastings & Dist. Electric Trams. Co.. Ld., Ord.	...	8¾ — 9¼
1	Do. do. 6% Cum. Pref.	...	⅛ — ¼
100	Do. do 4½% Deb. Stk. Red.	...	¼ — ¾
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	67 — 72
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.).....	...	93½ — 97½
10	Imperial Tramways, Ord.	...	86 — 90
10	Do. do. 6% Cum. Pref.	...	3 — 3½
100	Do. do. 4½% Deb. Stock	...	6¼ — 6½
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref....	...	74 — 76
100	Do. 4% Debenture Stock	...	2 — 2½
1	Kalgoorlie Elec. Trams., Ltd.	...	71 — 76
100	Do. do. 5% "A" Deb. Stk.	...	0 — ⅛
100	Do. do. 6% "B" do.	...	85 — 90
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.....	...	10 — 20
10	Lanarkshire Tramways Co.	...	⅜ — 1
100	Lancashire United Tramways. 5% Prior Lien Deb.	+ 1	9¾ — 10¼
1	Lisbon Electric Trams., Lim., Ord.	...	86 — 88
1	Do. 6% Cum. Pref.	...	1⅛ — 1⅜
100	Do. 5% Mort. Debs.	...	⅛ — ⅛
1	London and Suburban Trac. Co., Lim., Ord.	...	91 — 96
100	London General Omnibus Company, Limited, 4½% Deb.	...	⅛ — ⅛
100	Do. Do. 5% Cum. Inc. Deb. Stk. Red.	...	97½ — 99½
100	London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red	...	89 — 92
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref.....	...	63 — 67
5	Do. do. 5% Deb. Stk., Red.	...	5 — 5½
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	101 —103
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	— 2	109 —112 xd
$1,000	Do. do. 5% Bds.	...	99½ —100¼
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	⅛ — 1⅛
100	Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. ...	— 2	90 — 93
100	Do. 5% Deb. Stock, Red. ...	...	88 — 91
100	Mexico Tramways Co., Common Stock	— 4	68 — 71
500	Do. Gen. Con. 1st Mort. Gld. Bonds	...	80 — 84
100	Do. 6% 50-yr. Mort. Bonds	...	80 — 85
...	Michigan United Railways 5% 1st Mort. Gld. Bonds ...	...	91½ — 93½
100	Montreal Street Railway, Sterling 4½% Debs. (1922).....	...	98 —100
100	Do. 4½% Sterling Debs, (1922) ...	...	99 —101
1	National Steam Car Co. Ltd.	...	⅛ — ⅛
10	Oldham—Ashton and Hyde Elec. Ord.	+ ½	6 — 6½
10	Do. do. 5% Cum. Pref.	...	5¾ — 6
5	Para Elec. Rlys. and Ltg. Co., Ord.	— ⅛	4½ — 5
5	Do. do. 6% Cum. Pref.	— ⅛	4½ — 4¾
1	Perth (W.A.) Elec. Trams., Ld., Ord.	...	— —
1	Potteries Electric Traction Co., Ltd., Ord.	...	⅛ — ¼
1	Do. 5% Cum. Pref.	...	⅛ — ⅛
100	Do. 4½% Debenture Stock, Red.	...	84 — 87
1	Provincial Tramways, Lim., Ord.	+ 3/32	⅛ — ⅛
10	Do. 5% 1st Deb. Stock	...	95 — 98
...	Puebla Tramway, Light & Power Co., Prior Lien 5% ...	— 1	79 — 83
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.....	...	5 — 5½
100	Do. do. 4½% 1st Mt. Db. Stk.	...	95 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	89 — 91
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	— 4	95 — 97
100	Do. do. 5% 50-yr. Mort. Gold Bonds	— 4½	87 — 89
100	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	— 3	96 — 99
$500	Do. 5% 1st Mort. Debs., Red., 1939	— 3	96 — 99
10	Shanghai Elec. Construction Co.	...	12¾ — 13¾
100	Singapore Elec. Tramways Lim., 6% Debs. Red	...	88 — 93
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ...	...	⅛ — ⅛
100	Do. do. 4% Deb. Stk.....	...	66 — 70
...	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	— 1	95 — 97
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	+ 1	98 —100
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	83 — 88
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	93 — 95
5	United Elec. Tramways of Monte Video, Ord.	...	4½ — 5½
5	Do. do. 6% Cum. Pref.	...	4⅞ — 5⅛
100	Do. do. 5% 1st Deb. Stk. Red.	...	95 — 98
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	— 2	93 — 96
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	⅛ — ⅛
5	Do. do. 6% Cum. Pref.	+ ⅛	4 — 4½
100	Do. do. 4½% 1st Deb. Stock. Red.	...	88 — 92

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THE

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WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF DEVONPORT.

ELECTRICITY DEPARTMENT.

Tenders are invited for the supply and erection of the following plant:—

Section 1.—1,250 kw. Turbo Alternator, with Condensing Plant.

Section 2.—Two 500 kw. Rotary Converters and Switchgear.

Specifications, with form of contract, can be obtained from J. W. Spark, Borough Electrical Engineer, East Stonehouse, Devon, on deposit of two guineas, which will be returned on receipt of a *bonâ-fide* tender. Extra copies may be obtained at 5s. each, which sum will not be returnable.

Sealed tenders, endorsed "Tender for Electrical Plant," to be delivered at the office of the undersigned on or before mid-day, April 8, 1914.

The lowest or any tender will not necessarily be accepted

R. J. FITTALL,
Town Clerk.

Municipal Offices, Devonport,
March 16, 1914.

COUNTY BOROUGH OF SOUTHAMPTON.

CABLE.—ELECTRICITY DEPARTMENT.

The Corporation invite tenders for the supply of Cable to the Electricity Department during a period of twelve months.

Specification, conditions, and form of tender may be obtained upon application to the Borough Electrical Engineer, Southampton.

Sealed tenders, endorsed "Tender for Cable," must be delivered at the Town Clerk's Office, Southampton, by 12 o'clock at noon on the 27th inst.

No pledge is given to accept the lowest or any tender.

R. R. LINTHORNE,
Town Clerk.

Town Clerk's Office,
Municipal Offices, Southampton,
March 17, 1914.

SHANGHAI MUNICIPAL COUNCIL.

FIRE BRIGADE.

The Council invites tenders for the following:—

Two Motor-Driven Fire Pumps, capacity 300 gallons per minute.

Specification may be obtained from

Messrs. JOHN POOK AND CO.,
London Agents for the Municipal Council of Shanghai,
68, Fenchurch Street, London, E.C.,

to whom tenders should be sent on or before March 30, 1914.

March, 1914.

THE GREAT INDIAN PENINSULA RAILWAY COMPANY.

The Directors are prepared to receive tenders for the supply of the following Stores, namely:—

Brake Rigging.	Galvanised Wrought Iron Water Tubes, etc.
Crank and Straight Axles.	Galvanised Buckets, Mortar Pans, etc.
Cranked Fish-plates.	Wrought Iron (Grade B).
Steel Fish-bolts, etc.	Wrought Iron (Cable quality, Grade A).
Cast Iron Chairs.	Copper Pipes, Brass Sheets, etc.
Cast Iron Sleepers.	Miscellaneous Articles and Materials.
Wheels and Axles.	
Leather Belting, etc.	
Cloths, etc.	

Specifications and forms of tender may be obtained at this office on payment of the fee for the specification, which payment will not be returned.

Tenders must be delivered in separate envelopes, sealed and addressed to the undersigned, marked "Tender for Brake Rigging," or as the case may be, not later than 11 o'clock a.m. on Thursday, March 26, 1914.

The Directors do not bind themselves to accept the lowest or any tender.

R. H. WALPOLE,
Secretary.

Company's Offices,
48, Copthall Avenue, London, E.C.,
March 18, 1914.

SOUTH INDIAN RAILWAY COMPANY, LTD.

The South Indian Railway Company, Limited, are prepared to receive tenders for the supply of

Steel Rails (41lb. Flat-bottom Section), about 170 Tons; and Fish-plates for above Rails, about 34 tons.

Specifications and forms of tender may be obtained at the Company's Offices.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Company, Limited, marked "Tender for Steel Rails and Fish-plates," must be left with the undersigned not later than 1 o'clock on Wednesday, April 1, 1914.

The Company are not bound to accept the lowest or any tender.

A charge, which will not be returned, will be made of 10s. for each copy of the specification.

Copies of the drawings may be obtained on payment at the offices of Robert White, Esq., M.Inst.C.E., Consulting Engineer to the Company, 3, Victoria Street, Westminster, S.W.

By order, V. E. de BROE, M.Inst.C.E.,
for Managing Director.

Company's Offices,
91, York Street, Westminster, S.W.,
March 17, 1914.

TYNE IMPROVEMENT COMMISSION.

FLAT-BOTTOM RAILS AND FISH-PLATES.

The Tyne Improvement Commissioners are prepared to receive tenders for the supply and delivery of 400 tons of Flat-Bottom British Standard Steel Rails, 80lbs. per yard, and 16 tons of Fish-plates.

Copies of the form of tender, conditions of contract, and specification may be obtained on application to the undersigned on payment of a deposit of £1, which will be returned on receipt of a *bonâ-fide* tender.

Tenders, in sealed envelopes, endorsed on cover "Tender for Rails and Fish-plates," must be addressed to the undersigned and delivered to him not later than noon on Wednesday, the twenty-fifth day of March, 1914.

The Commissioners do not bind themselves to accept the lowest or any tender.

By order, J. MCDONALD MANSON,
General Manager and Secretary.

Tyne Improvement Commission Offices,
Bewick Street, Newcastle upon-Tyne,
March 14, 1914.

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CITY OF CARLISLE.

ELECTRICITY DEPARTMENT.

The Corporation of Carlisle invite tenders for the supply of the following Stores, etc., for the year ending March 31, 1915 :—

Schedule 2. (*c*) Lubricating Oils, Greases, etc.
,, 3. (*d*) Cables.
,, 4. (*e*) Transformers.

Specification, with general conditions and form of tender, may be obtained from the undersigned at the Electricity Offices, Victoria Viaduct, Carlisle, upon payment of a deposit of five shillings for each section, which will be returned after the tenders have been adjudicated upon, provided a *bonâ-fide* tender is sent in by the date specified and not withdrawn. Extra copies of each specification may be obtained at the sum of one shilling each, which is not returnable.

Tenders, properly endorsed and sealed with wax, to be sent to the undersigned not later than 9 a.m. on Wednesday, April 1, 1914.

The Corporation do not bind themselves to accept the lowest or any tender, nor will the Corporation pay any cost incurred in tendering.

Fredk. W. Purse, M.I.E.E., M.I.Mech.E.,
City Electrical Engineer.

Electricity Offices, Victoria Viaduct, Carlisle,
March 11, 1914.

POSITION VACANT.

ENGINEER.

Overhead Equipment of Electric Railways. An English-speaking Engineer wanted for Australia, who has had experience in the laying out of the above. Apply, stating salary required, with full particulars and references, to British Insulated and Helsby Cables, Limited, Prescot, Lancs., England.

PATENTS FOR SALE.

THE OWNERS OF BRITISH PATENTS, Nos. 24507 of 1907, entitled "Improvements relating to the Manufacture of Car Wheels," and 7899 of 1909, entitled "Method of and Apparatus for Re-forging Car Wheels," are desirous of disposing of the patents or entering into working arrangements under license or otherwise with firms likely to be interested in the same.

Copies of the patent specifications and full particulars can be obtained from and offers made (for transmission to the owners) to Marks and Clerk, 57 and 58, Lincoln's Inn Fields, London, W.C.

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THE SANITARY WOOD PAVING
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for finishes of great durability and brilliant lasting lustre.
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E.C.

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BRITISH ISLES. W. C. Knight, 75, Surrey Street, Sheffield. Wm. C. Yuille & Co., 60, Brown St., Anderston, Glasgow. Equipment & Supplies, Ltd., 7, Anglesea Street, Dublin.
FRANCE. Chas. d'Albert, 15, Avenue Larcher, Chatou (S & O).
GERMANY. Heinrich Vellguth, 1, Glockengies-serwall, Hamburg.
BELGIUM. l'Anglo-Belge Electrique, 72, Avenue de Tervueren, Brussels.
SWEDEN. E. & L. Davidson, Grefmagnigatan 15, Stockholm.
SWITZERLAND. G. Sigerist, 8, Mitti. Haldenstrasse, Winterthur.
ITALY. Chas. de Grave Sells, 5, Via Ponte Calvi, Genoa.
SPAIN. Peninsular Engineering Co., Puerta del Angel 10, Barcelona.
SOUTH AFRICA. F. Peabody Rice, 2', Standard Bank Buildings, Johannesburg.
AUSTRALIA. H. A. E. Rothwell, Cromwell Buildings, Bourke Street, Melbourne, Victoria.
NEW ZEALAND. James Jackson, Box 731, G.P.O., Wellington.
JAPAN. W. M. Rooke & Co., 184, 5 Chome, Nakanoshima, Osaka.

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THE
Tramway AND Railway World

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SATURDAY, MARCH 21, 1914.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
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HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

MUNICIPAL INDUSTRY ON BUSINESS PRINCIPLES.

No more significant recommendations have ever been made to a municipal authority than those put forward by the Special Committee of Leeds Corporation, which was originally appointed to deal wth the recent strike of municipal employees. The only precedent for such an arrangement as that proposed is to be found in a few towns in the United States, where, during recent years, the powers of the local authorities have been curtailed, and the citizens have handed over the management of municipal affairs to a small paid body of Commissioners, more or less expert, and more or less independent of direct democratic control. To a certain extent, and particularly in regard to labour questions, the Leeds scheme is analogous. The Special Committee of five aldermen—Messrs. C. H. Wilson, F. M. Lupton, R. A. Smithson, J. R. Ford, and F. Kinder—not only proved highly successful in putting an end to the strike, but to their report giving a history of the whole matter they have added a most useful discussion of the labour arrangements in the various municipal departments, and a series of recommendations calculated both to prevent strikes in future and to add greatly to the efficiency and economy of municipal work. The first of these drastic proposals is that a General Purposes Committee of seven members be formed, to which the Corporation are to delegate full power to deal with the appointment, control, dismissal, wages, hours, and conditions of labour of all Leeds municipal workmen. Associated with this is the recommendation that Mr. J. B. Hamilton, general manager of the tramways, be appointed executive officer of the General Purposes Committee. Among other proposals the significant one, taken in connection with the above, is that the City Council shall meet only once a quarter. It will be observed that this scheme really means the relieving of the City Council generally of many duties which every popularly elected body has difficulty in performing satisfactorily, and delegating them to a small executive, which can meet as often as need be. Apparently, there is no formal power of appeal from the Committee to the Council, and the infrequent meetings of the latter will prevent useless discussion on the action of the Committee. Whether quarterly meetings of the Council will be able to overtake the other business remains to be seen. The success of such a plan must depend mainly on the ability, discretion, and business capacity of the members of the Committee and of their general manager. If the five aldermen who acted with such conspicuous success as the Strike Committee are members of the new body, and if they have as their executive officer an administrator so capable and experienced as Mr. Hamilton, there can be little doubt that the scheme will prove of the greatest advantage to the city. Apart even from the question of dealing with strikes or threatened strikes in the future, it is plain from the report of the Special Committee that there is an abundance of work for the new General Purposes Committee. The experiences of the recent strike showed that various departments have employed far too many men, and that great economies can be effected by keeping down the numbers and introducing more modern plant and appliances, as for example, in the gas department. Then much can be done in the way of co-ordination of departments, and the transfer of men from one department to another, as required. Irregular employment or casual labour can thus be diminished, and not only can the conditions be made better for the workmen, but great economies in municipal expenditure can be effected. In fact, Leeds may look forward to having a properly organised municipal machine for all its labour departments, instead of a number of departments working independently, and, to a certain extent, wastefully. The organising power which has made the Leeds tramway department such a great success, and which was instrumental in almost wholly preventing the late strike from affecting that undertaking, may be trusted to show its beneficial influence over all the Leeds departments which employ labour when Mr. Hamilton has got fairly into the work. The whole experiment is a significant sign of the times, and it may be read along with the lesson of the present lock-out in the London building trade. The time appears to be near at hand when neither municipalities nor private employers will longer consent to be the victims of an aggressive trade unionism which borders more and more on syndicalism.

TRAFFIC CONGESTION AT MANCHESTER.

Speculation has been rife at Manchester during the week as to the recommendations contained in the report which Mr. J. M. McElroy, the general manager of the tramways department, placed before a sub-committee of the Tramways Committee on Tuesday, as the result of his visit to the United States and to the Continent to study street traffic conditions. Any congestion of traffic that may exist in Manchester does not approach in severity the congestion to be found in London, but the object of Mr. McElroy's investigations is to submit proposals that will prevent as far as possible an undue increase in future years. Thus, prior to entering upon the tour he had submitted a report on the probable increase of tramway traffic duing the next twenty years. During that period the city will have

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extended its boundaries, and the consequent additions to its tramways will bring an increase of traffic into the main arteries. In drawing up his report Mr. McElroy has borne in mind the provision necessary to diminish the increasing congestion in the central streets and for facilitating tramway traffic by the following or other means:—Widening of existing streets or the construction of new streets; the acquisition of an arterial centre for the marshalling of tramway traffic; and the construction of subways for tramcars. He also had to take into consideration the extent to which the financial resources of the tramway undertaking can be applied for that purpose. Dealing with the forecasts of his report in their relation to the foregoing objects, it is evident that he suggests the construction of at least two new streets, in order to relieve traffic on main routes. Linked up with these proposals there are suggestions for extending existing tramways, including the provision of new lines radiating from the centre. In one quarter it is stated that, as the result of considerable attention devoted to motor omnibuses, the provision of motor omnibus routes is also suggested. The report also embraces the construction of terminal marshalling centres for cars in such places as Piccadilly, Albert Square, Marsden Street, Stevenson Square, and Cannon Street. The first-mentioned centre has lately been cleared of the old infirmary, and it is admitted to be the scene of the worst of such congestion as exists. Some controversy has already taken place as to the manner of utilising this site, and Mr. McElroy will probably be found to have asked for the use of only a portion of the cleared area. Piccadilly and its exits appear to be the only places for which the general manager has suggested the provision of a subway. This scheme applies to a mile and a quarter of streets, beginning some distance south-east of the London Road Station and ending at the Exchange Station. The subway would thus run under London Road, Piccadilly, Market Street, and Blackfriars Street. At the London Road end of this route, of which Piccadilly is the highest point, there is a drop in the level of 37 ft. and at the Blackfriars end the drop is 45 ft. Consequently there would be no difficulty in forming a subway deep enough to accommodate double-deck cars. What with the diversion of sewers and street widening, it is stated that the cost of a subway would be more than half a million sterling, and, on the ground of the expense Mr. McElroy is declared to have decided against the subway construction, both here and at other places. In 1903 a private promoter submitted a scheme for an underground electric railway, which failed to secure the support of the Tramways Committee. A member of that Committee who has been interviewed this week appears to think that there is an urgent need to discuss the subway scheme, and he suggests that a combination between the railways in Manchester for a joint undertaking to connect the stations and the Ship Canal would be a formidable one. There is one aspect of the subway proposal that ought not to be lost sight of, namely, that it would leave a widened Piccadilly available for the organisation of a municipal motor omnibus service. This could be made to radiate to districts not served by tramways. Another suggestion attributed to Mr. McElroy is the adoption of transfer tickets. In London these tickets, single and return, are of great utility in meeting omnibus competition, and their extension a few months ago to the Kingsway subway route has given that link between the northern and southern systems an importance far greater than it previously possessed.

LABOUR DEPARTMENT FOR LEEDS.

Mr. J. B. Hamilton, the Tramways Manager, to be also Appointed Commercial Manager.

Alderman C. H. Wilson, F. M. Lupton, R. A. Smithson, J. R. Ford, and F. Kinder, the Special Committee appointed by Leeds City Council to deal with the recent strike of the municipal employees, issued a report on March 13, in which they made the following recommendations:—

(I.) That a General Purposes Committee be formed, and that the Committee consist of seven members.

(II.) That the Council delegate to such Committee full power to deal with all matters arising out of or in connection with—(*a*) The appointment, control, and dismissal of all workmen; (*b*) Wages, hours, and conditions of labour of all workmen; (*c*) The distribution and supply of labour to the various departments; (*d*) The reorganisation of the Cleansing and Highways Departments.

(III.) That Mr. J. B. Hamilton be appointed executive officer of the General Purposes Committee at a salary of £500 per annum, to act under the instructions of the Committee in the above duties and in such other duties as may from time to time be delegated to the Committee.

(IV.) That only applicants who are found suitable and are certified as fit after being medically examined shall be permanently engaged.

(V.) That no one in an official position shall be a member of a Union existing amongst those over whom the official is placed.

(VI.) That the City Council meet once in each quarter, and that the necessary consequential alterations be made in the Standing Orders and delegations of duties to Committees.

The Committee add: "The strike has shown the necessity for improved methods of dealing with wages, conditions of work, hours of labour, etc., of municipal workmen. To enable such matters to be dealt with properly, the fullest information as to comparable work in other towns must be systematically obtained, as well as the conditions obtaining with private employers in the city, and also with trade unions, where standard rates have been established. The formation of a commercial department for obtaining and collating such particulars is an absolute necessity. This would probably lead to a similar arrangement in other cities, and there would thus be a constant interchange of actual facts.

"We recommend that a General Purposes Committee be appointed as one of the Standing Committees of the Council, with power to act in regard to all the foregoing matters. In our opinion such Committee must be entrusted with the general arrangements as to labour in all departments of the Corporation. To enable this to be carried into effect, it is necessary to appoint a commercial manager to carry out the work above indicated. One important result of such appointment would be to eliminate casual employment, and to render permanent as far as possible the positions of men who are efficient under the Corporation."

Embraced in the Committee's report is the entire history of the strike and of its settlement, with the results of the investigation made into the work of the various departments, several of which were found to be overstaffed. In the highways department 248 men ceased work, and the Committee state that they "are convinced that a considerable saving can be effected if all possible work is put out to contract. The road work of the highways and tramways departments touch at so many points, and overlap in so many ways, that uniformity of control as regards the maintenance of the roads and the paving of the permanent ways would result in considerable saving, and a great reduction in inconvenience to the citizens. It is therefore a matter for grave consideration whether the direction and control of the whole of the streets and highways of the city should not be combined in one department."

"In the tramways department over 2,600 men are employed. The general rule that has been in operation for many years is that no official in charge of other men shall be a member of any union. Consequently, when the strike was declared, everyone in an official position, including foremen, inspectors, timekeepers, gangers, and leading hands remained at their posts, and it is not too much to say that the speedy termination of the strike in this department was due to the fact that so large a body of men remained loyal. Whilst the Committee take up a neutral position as to whether workmen should or should not be members of a union, they recognise that, in the case of those in official positions, the obligations of a union prevent them from doing their duty properly towards their employers. It is for this reason that the Committee recommend that in future it be a condition of appointment that no one in an official position shall be a member of a union existing amongst those over whom the official is placed. A considerable portion of the work of the tramways department, particularly in the repair and renewal of the permanent way, is seasonal. At the present time, many men who are employed in the tramways department through the summer go to the gas works during the winter, but in the absence of a Central Organising Office for the exchange of labour between the different departments, a very considerable amount of casual employment ensues. We hope that as a result of our inquiry and recommendations this will not obtain in the future."

Alderman Wilson presented the report to the Council at that authority's meeting on March 18, when he stated that the heads of the cleansing and highways departments and also a minor official of one of the departments had resigned, while a fourth had died. It was over these two departments, as well as the tramways, that Mr. Hamilton would preside, with an increase of £500 to his present salary of £1,000. The alderman added that the same method was adopted in America. Leeds on the whole paid the best

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wages of any corporation in the Kingdom and they wanted to have the best men, and it was proposed that all new employees should undergo physical examination just as did the tramwaymen.

Opposition to the proposals was expressed by the Labour members, and the discussion was adjourned until March 27th.

L.C.C. TRAMWAY MATTERS.

RECONSTRUCTION OF LONDON UNITED TRAMWAY TRACKS.

At last Tuesday's meeting of the London County Council the Highways Committee referred to estimates amounting to £35,800 approved last year for the reconstruction of the tracks of the London United Tramways at Goldhawk Road and King Street, Hammersmith, and on the Hammersmith loop. The Council had also decided to enter into agreements with the tramway company for the execution of the work. As the work proceeded it was found that the concrete foundations were very defective, and it became essential to lay new foundations. This work would result, in conjunction with the extra cost of wages, the increased cost of rails and the provision of an additional cross-over, in greatly increasing the cost of construction. It was proposed accordingly to sanction additional expenditure of £12,500. The Finance Committee noted in connection with this matter that in accordance with the agreements between the Council and the tramway company the latter would meet the debt charges in respect of the cost of reconstruction and the cost of maintenance and renewal until the undertaking was taken over by the Council. Consideration of this report was adjourned.

THROUGH RUNNING WITH METROPOLITAN TRAMWAYS.

Negotiations had recently been proceeding with the Metropolitan Electric Tramways, Limited, for the institution of through running services between the Council's tramways and those of the company *viâ* Archway Road. The Archway Road tramways were worked on the overhead system while the remainder of the Council's lines in this district were worked on the conduit system. It was therefore necessary to fix a change-point from one system to the other. The arrangements would necessitate the removal of a single line lay-by and a cross-over, and the cost of the whole work was estimated at £750. The Committee recommended that the work be carried out by the direct employment of labour, and that the castings required be obtained from Hadfield's Steel Foundry Company.

TRAMWAY SUPPLIES.

The following tenders from selected firms for the supply of track insulators and porcelains had been considered :—

	Track Insulators, 6,000. Price a 100.	Track Insulators, 6,000. Price a 100.	Porcelains, 5,000. Price a 100.	Porcelains, 5,000. Price a 100
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Buller's, Limited	19 15 10	19 15 10	3 15 0	3 15 0
Gaskell & Grocott, Longport ..	—	—	3 6 8	—
Taylor, Tunnicliff & Co., Hanley	—	—	3 13 0	3 13 0
Doulton & Co.	—	—	3 15 0	3 15 0

The Committee had accepted the tender of Buller's, Limited, for the whole of the 12,000 track insulators, the estimated expenditure being £2,375, and the tenders of Gaskell and Grocott at £3 0s. 8d. a 100, and Taylor, Tunnicliff and Company at £3 13s. a 100 for 5,000 porcelains each, the estimated expenditure being £166 13s. 4d. and £182 10s. respectively.

The undermentioned tenders had been received for the supply of 150 two-way change-over switches for the tramways :—

	Price a Switch. £ s. d.	Total amount of Tender. £ s. d.
Johnson and Phillips	1 15 0	262 10 0
Spagnoletti, Limited	2 9 6	371 5 0
British Westinghouse Company	3 4 6	483 15 0
Brush Electrical Engineering Co.	3 8 0	510 0 0

The estimate of the chief officer was £472 10s. The Committee had accepted the tender of Johnson and Phillips

These reports were adopted.

PRIVATE BILL LEGISLATION.

IS IT ADVISABLE TO BLOCK A BILL AT EVERY STAGE?—Oxford City Council have had a long discussion on a proposal by Alderman Carter to ask Lord Valentia to block the Tramways Company's Bill again on the second reading stage. The alderman said he had submitted the following question to Mr. F. W. Pember, an eminent counsel at the Parliamentary Bar, and to Dr. Hazel, a lawyer who had had some practical experience as a member of the House of Commons :—" If you want to oppose a Private Bill or to secure better terms from the promoters of that Bill, is it advisable to block the Bill at every stage?" Dr. Hazel wrote :—" My experience when in the House of Commons was that if one wished to force concessions from the promoters of a Private Bill, the best course was to block the Bill persistently, in spite of all blandishments. If you do this on second reading you can not infrequently get good terms in the shape of promises of concessions in committee." Mr. Pember wrote :—" I think the Tramway Company's Bill ought to be blocked on each occasion when it comes up in the House of Commons. The result of this will be that after the Bill has been blocked a certain number of times, a day will be specially appointed for its discussion on second reading. Then a determined effort should be made to get the second reading refused." By 28 votes to 8 the Council rejected the proposal.

LONDON ELECTRIC RAILWAY.—Sir Luke White's Committee of the House of Commons on March 12 granted powers to the London Electric Railway Company to construct various improvements at Underground Stations. Mr. Balfour Browne, K.C., said it was proposed to construct three new subways and an escalator at Tottenham Court Road station, a subway and escalator at Piccadilly Circus, and a subway and escalator at Trafalgar Square. It was also desired to acquire land at Westminster for the purpose of extending the offices occupied by the company. Mr. Dalrymple Hay, engineer to the company, said the total cost of the work would be £100,270. The most expensive work would be the Piccadilly subway and escalator, which would cost £64,500.

NORWICH TRAMWAYS COMPANY.—Although the consents of the local authorities to the provisions of this Bill were not obtained until some weeks after the appointed time, the Standing Orders Committee of the House of Lords have agreed to allow the Bill to proceed.

OXFORD AND DISTRICT TRAMWAYS BILL.—The Court of Referees of the House of Commons have disallowed the petition of the Oxford Gas Company to be heard against this Bill. Mr. Lankester, K.C., for the petitioners, said the Bill was promoted apparently with the view of abolishing tramways in Oxford, and for a substituted service of motor omnibuses. In either alternative the proposals, if carried out, might injure or interfere with the company's mains or pipes. Mr. Talbot, K.C., for the promoters, submitted that the practice of the Court had been uniform to refuse *locus standi* to companies on the ground that they were sufficiently protected by the Tramways Act. With regard to the new tramways, the protection continued. It was the height of absurdity for a gas company to claim to be heard against a proposal to run motor omnibuses when there was already authority to run such vehicles in Oxford.

PRESTON CORPORATION.—This Bill, which came before a House of Commons Committee on March 17, asks for powers to enable the Corporation to borrow £26,000 for tramway extension, £33,500 for the purchase of land for the construction of streets, £105,000 for dock equipment on the River Ribble, £103,400 for dredging and deepening the river, and the construction of railways, etc.

MISCELLANEOUS NEWS AND NOTES.

Scottish Provisional Orders.—An inquiry into the Glasgow Corporation draft Provisional Order will open in the Justiciary Court House, Glasgow, on March 24. Subsequently the Commissioners will proceed to Edinburgh to hear the Colinton Tramways Extension application.

Tramways and Light Railways Association.—The journal of this Association contains a full report of the proceedings of the general meeting and of the annual dinner which was held on Friday, March 6. Reference is also made to the death of Mr. C. C. Hutchinson, K.C., who will be regretted by a large number of friends in the tramway world.

Brighton and Hove Railless Traction Differences.—While Brighton Council have decided in favour of the under-running system of railless trolley traction, owing to the necessity of crossing tramway tracks, the Hove Council appear to prefer the over running system. Brighton Council therefore suggests that the matter should be referred to the arbitration of the Board of Trade.

To Meet Tramway Competition in Lancashire.—The new type of carriages which are being operated on the overhead trolley line of the Lancashire and Yorkshire Railway between Bury and Holcombe Brook have two doors on each side of a coach. At stopping places where there are no platforms, the guard lets down the folding steps when passengers wish to alight. The cars are run singly, each end being equipped with motors.

Conveyance of Goods on Lancashire Tramways.—The general manager of Liverpool Corporation tramways has been directed to enter into negotiations with the tramway companies in south-west Lancashire and the other tramway authorities interested with the object of inaugurating a service of one or two motors and trailers for the conveyance of goods, and to report to the Tramways Committee as to the probable capital expenditure required.

Holidays with Pay.—A report has been presented to Darwen Tramways Committee by the manager, containing information obtained from other towns in respect to granting holidays with pay to tramway employees. If the request is granted, it will establish a precedent which the employees of other Corporate departments may claim to come under, and the Committee have left the matter in the hands of the General Purposes Committee.

Proposed Electric Tramways for Stirling and District.—Before proceeding further in the consideration of the offer of Mr. George Balfour to purchase the electricity works and provide a system of electric tramways for the town and district, the Stirling Corporation have resolved to make inquiry as to a system of tramways from Bridge of Allan to Bannockburn, to be undertaken by the Council upon arrangements being made with the County Council, the Town Council of Bridge of Allan, and the Stirling and Bridge of Allan Tramways Company.

Leicester's Indebtedness to its Tramways.—The Corporation have adopted the annual reports of the Tramways Committee on the tramways and electricity undertakings for 1913, allocating £10,000 of the surplus profit for the relief of rates. In reply to a question, Alderman Flint said that £6,000 of the £20,000 surplus had already been spent in assisting the Highways Committee in the purchase of property. The purchase of land at a cost of £4,500, to enlarge the Lero generating station, was agreed to. With reference to the Tramways Committee's acquisition of houses to widen King Richard's Road for the tramways, the Council agreed that, as so few people are affected, the Local Government Board be requested to dispense with a housing scheme as unnecessary.

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The G.E.C. Dinner.—More than 700 guests enjoyed the hospitality of the directors of the General Electric Company at their annual dinner on Saturday, March 14, at the Trocadero Restaurant. The guests included many of the most prominent men in the electrical field, both at home and abroad, together with a number of Colonial representatives. Last year it will be remembered the G.E.C. celebrated its 25th anniversary at an "At Home" in the Covent Garden Opera House, when some 2,500 guests were entertained. In proposing "The Electrical Industries Within the Empire," Mr. Hugo Hirst, the chairman, referred to the general expansion which had taken place in all parts of the world, and said that the G.E.C. had shared in the prosperity that had prevailed. They had added Toronto to their oversea organisations, and were looking forward to large developments in Canada in the near future. In accordance with their policy to manufacture everything electrical he was pleased to announce that their new cable works at Southampton were rapidly nearing completion, so that, the one branch of the industry hitherto neglected, from a manufacturing point of view, would henceforth receive their close attention. Mr. Hirst also mentioned the fact that the G.E.C. had secured a site in Kingsway for their new headquarters, which would enable them to concentrate the whole of their administrative offices under one roof.

Special Roads for Tramways.—Mr. J. A. Brodie, the city engineer, presiding at a conference held in connection with the Liverpool Town Planning and Housing Exhibition, referred to the fenced-off tramway track which is being constructed in Edge Lane, Liverpool. Speed was becoming a matter of so much greater importance since the introduction of motor cars and omnibuses, etc., that, in his view, the tramcar would respond with a fenced off track in the roadway, along which it could travel at a speed in advance of anything likely to be legalised on a roadway used by general traffic. A length of such a roadway had been authorised in Liverpool, and the land had been acquired, and the setting back of the fences to a total width of 120 feet had been commenced. The present narrow carriage-way would be retained. The tramways would be laid on sleepers across grass at a cost of £3,000 per mile instead of £6,000, and a duplicate narrow roadway would, when required by the development of the land alongside the road, be provided. By using a motor car he could reach the municipal offices from his house, which was four miles distant, in 15 minutes, but a tramway car took at least 40 minutes. He did not see why, as long as the municipality owned the vehicle, a good deal of that time should not be saved. In his view they would have much greater speed in the future. Mr. H. E. Stilgoe, city engineer of Birmingham, endorsed Mr. Brodie's suggestions, and mentioned that Birmingham had increased its area from 14,000 acres to 43,000 acres. This demanded a system of arterial roads, and the first ring road projected was 100 feet wide.

CONTRACTS AND ORDERS.

Hurst, Nelson and Co., Limited, have obtained a contract to supply two double-deck top-covered cars, at £877 10s. 0d. per car, to Ayr Corporation tramways.

Trail Cars for York.—A contract has been given by York Council to the Brush Electrical Engineering Company for the supply of four trail cars for the tramways department.

Siemens Bros. Dynamo Works have received a further contract for the annual supply of Tantalum traction lamps for the Croydon tramways; also for Wotan drawn-wire lamps.

Glasgow Council have accepted the tenders of Bolckow, Vaughan and Co. for steel rails and fish-plates, of John McSkimming for steel drop forgings, and of Dryers, Limited, for car brake gear.

British Insulated and Helsby Cables, Limited, have secured at their Prescot works a contract for supplying the overhead equipment of the Melbourne suburban railways, amounting to nearly £300,000.

Walsall Council have accepted the tender of Ferranti, Limited, for a 150 k.v.a. transformer, £112; of Walsall Electrical Company for switchgear, £50; and of the General Electric Company for a motor, £20.

Swindon Council have awarded a contract to the Building and Public Works Construction Company for the construction of the foundations and condenser pit for additional plant at the electricity works.

Bexley Council have allotted to the British Westinghouse Company a contract for the supply of a 500 kw. turbo-alternator with exciter, at £3,675, and to Stirling Boiler Company for a water-tube boiler, at £1,703.

Carlisle Council have placed the following contracts:—Oerlikon Company, turbo-alternator and condensing plant, £4,008; British Westinghouse Company, Limited, rotary converters, £2,855, high-tension switchgear and second feeder panel, £675.

The National Time Recorder Company, of 5, Blackfriars Road, S.E., patentees and manufacturers of time recorders, inform us that they have obtained the contract for the supply of their patent check action automatic time recorder to the Metropolitan Water Board.

Thermit, Limited, have contracts in hand, or shortly to be commenced, for welding at the following, among other places:—Bolton, Burnley, Bradford, Brighton, Bournemouth, Dublin, Manchester, Liverpool, Salford, London County Council, London United Tramways, Sheffield, Southend, Rotherham, Northampton, Nottingham, Huddersfield, Warrington, Shipley, etc. During 1913 the number of joints welded in the United Kingdom amounted to nearly 17,000, and the number welded throughout the world was over 108,000. All the work carried out in this country has been on new or reconstruction work.

Southend Council have allotted the following contracts:—Belliss and Morcom, Limited, five Diesel oil engines (including £200 for contingencies), £14,510; Brush Electrical Engineering Company, Limited, three single-deck open type tramcars £2,811, three coal trucks £166 10s., electrical equipment for three coal trucks £711.

Cliff Railway for Torquay.—Offers from four firms have been received for the construction of a cliff railway to connect Babbacombe Downs with Oddicombe Beach, and Torquay Council have deferred a decision pending receipt of plans from the National Electric Construction Company, and T. L. Harding and Sons, of Torquay.

London County Council have accepted the following tenders:—Buller's, Limited, 12,000 track insulators, at £19 15s. 10d. a 100; Gaskell and Grocott, 5,000 porcelains, at £3 6s. 8d. a 100; Taylor, Tunnicliff and Co., 5,000 porcelains, at £3 13s. a 100; Johnson and Phillips, 150 two-way change-over switches, at £1 15s. each—£262 10s.

Ipswich Council have allotted the appended contracts:—

Alternator, rotary converter, automatic voltage regulator and certain switchgear, British Westinghouse Electric and Manufacturing Co., £2,213. Three 50-kw. transformers and a testing transformer, Ferranti, Ltd., £194. High and low-tension switchgear for main power station and sub-stations, Voigt & Haeffner (England), Ltd., £1,993. Two rotary converters for Duke Street converter sub-station, British Westinghouse Electric and Manufacturing Co., at £1,566. High and low-tension underground cable Secs. A and B, Ateliers de Constructions Electrique du Nord et de l'Est (agents, W. H. Butler and Co.), £6,158. Service boxes, British Insulated and Helsby Cables, Ltd., Prescot, at £40.

Manchester Council have given out the following contracts:—

Babcock & Willcox, Ltd., two water-tube boilers and induced-draught plant. Lancashire Water Cooler Co., water cooler. Edison & Swan Co., Ltd., high and low-tension switchgear. Crompton & Co., Ltd., balancing plant. Vaughan & Son, Ltd., 7½ tons overhead travelling crane. British Westinghouse Electric Co., Ltd., Electric Construction Co., Ltd., and Ferguson, Pailin & Co., high and low-tension switchgear for sub-stations. British Insulated & Helsby Cables, Ltd., Johnson & Phillips, Ltd., Connolly Bros., Ltd., Chas. Macintosh & Co., Ltd., and Electrical Engineering and Equipment Co., Ltd., supplies of cable.

The Mirrlees Watson Company, Limited, have recently received orders for condensing plant for Leeds Corporation (per Willans and Robinson, Limited), Haunchwood Colliery (per Greenwood and Batley, Limited), Griff Colliery (per Greenwood and Batley, Limited), Millom and Askam Hematite Iron Company, Limited (per Fraser and Chalmers, Limited), Langwith Colliery, Enfield Lock, Burgh of Kilmarnock, Ardrossan Harbour Company, Frickley Colliery, Swanwick Colliery, Brunner, Mond and Co., and Hulton Colliery.

Leeds and Battery-Driven Motor Cars.—Upon the minutes of the Tramways and Electricity Committee coming before a meeting of Leeds Corporation, Councillor Foster asked for particulars of an electrically-driven motor car which it was proposed to purchase at a cost not exceeding £600. Councillor R. Armitage said he was largely responsible for the resolution. During his visit to America he had observed a largely increased number of electrically-driven motor cars on the streets, and the electric power companies had benefited through this. If this class of motor could be popularised the revenue of the electricity department would be increased. Alderman H. Brown (vice-chairman) said that the object of the committee was to increase the sale of electricity, and if they failed to take advantage of the chances placed before them they would not be doing their duty. He would promise, however, that they would not buy this car.

PERSONAL.

Halifax Council have increased the salary of the electrical engineer from £600 to £700.

Mr. F. J. S. Hosken, general manager to the Darwen Corporation tramways, has been granted an increase in salary.

Mr. Bell, city electrical engineer to Aberdeen Corporation, has, by 17 votes to 11, been given an increase of £50 in his salary of £700.

Motorman A. B. Fuller has been appointed tramway inspector at Doncaster in succession to Inspector Brown, who has gone to Ayr as traffic manager.

Mr. W. T. Robson, general manager of the South Shields Corporation tramways, has been unanimously voted an increase of salary of £50 per annum.

Mr. John Muir, well known in connection with the solid tyre department of the Continental Tyre and Rubber Company, has been promoted to the position of manager of that section of the firm's business.

Mr. F. Ayton, tramways manager and electrical engineer at Ipswich, has had his salary raised from £600 to £700 as from April 1 last, in lieu of the bonus for which he was recommended by the Electricity Committee.

Mr. H. Richardson, of Dundee, has been appointed electrical engineer to Salford Council at a salary of £1,000 per annum. Before going to Dundee in 1902 Mr. Richardson was assistant engineer of the Newcastle Corporation tramways department.

Mr. H. Huoton, who is about to join the staff of the Continental Tyre and Rubber Company, Limited, will be well remembered on account of the success with which he carried out a price-maintenance scheme some years ago, when he was connected with another important tyre firm; and he is certain of a warm welcome from his many friends in the trade.

L.C.C. Highways Committee.—At last Tuesday's meeting of the London County Council the following were appointed the members of the Highways Committee for the ensuing year:—Sir John Benn, Messrs. B. B. Evans, Alfred O. Goodrich, H. H. Gordon, G. H. Hume, William Hunt, Captain A. C. H. Kennard, Mr. H. Lidiard, Lord Monk Bretton, Messrs. Theodore Prestige, A. Cooper Rawson, A. H. Scott, W. J. Squires, Henry Ward, Sir Edward White, and Mr. A. W. Yeo.

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Mr. John Harper, the acting chief commissioner of New South Wales Government Railways and Tramways, presiding at the annual meeting of the employees' institute at Sydney, remarked that the present staff had greater opportunities than were ever vouchsafed him, as whatever he knew he had had to pick up in a direct way as he went through the service. He joined the department in as humble a capacity as anyone present, and had now reached the top of the tree. The same chance was open to all.

Bradford Officials' Salaries.—The following increases of salary have been made by the Tramways Committee:—Mr T. B. Moseley, chief clerk, from £165 to £190; Mr. J. W. Foster, engineering assistant, £245 to £270; Mr. T. Stirk, traffic superintendent, £235 to £250; and Mr. J. W. Dawson, assistant electrical engineer, £245 to £270, with a further £25 in April, 1915. Increases have also been granted to Mr. T. G. Richardson, car shed superintendent, and the other technical assistants, also to the various foremen.

We regret to record the death of Mr. C. C. Hutchinson, K.C., who passed away on the 7th inst., after a short illness. Mr. Hutchinson was one of the leaders for the Metropolitan Electric Tramways in their recent rating test case, which was won in the Court of Appeal but was reversed in the House of Lords.

FINANCIAL REPORTS AND MEETINGS.

South Metropolitan Tramways and Lighting.—The total revenue for the year amounted to £63,135, compared with £61,944. There remains a surplus of £15,026 and £922 brought forward. The directors propose to place to reserve £5,000, and declare a dividend at the rate of 6 per cent. per annum on the preference stock for the year, leaving to be carried forward £775.

The British Electrical Federation.—The traffic statement for the week ended March 13, 1914, shows that the receipts from tramways and railways amounted to £37,032, as compared with £36,648 in the corresponding week last year, and from omnibuses £12,066, as compared with £3,491, making a total of £49,098, as compared with £40,139. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year the receipts show an increase of £924 upon the week.

Madras Electric Tramways Company.—Out of a profit of £21,345 and £3,432 brought forward, a dividend of 5 per cent. is proposed on the ordinary shares, adding £7,000 to the renewals fund, writing £500 off issue expenses, and carrying forward £3,320. The traffic receipts show an increase of 7.71 per cent., and further rolling stock is being provided. At the meeting on March 12, the chairman (Mr. A. M. Quill) said that against the increased receipts there were the increased operating expenses and the additions to wages. Owing to the close working arrangements existing with the Electric Supply Corporation the management in Madras had been merged since December 1 last.

Metropolitan Electric Tramways.—The revenue for the year amounted to £530,245. After adding the balance brought forward from 1912 and deducting all expenses chargeable to revenue, there remains £52,282. The directors propose to place to reserve account £12,000 and to pay a dividend on the ordinary shares at the rate of 3 per cent., leaving to be carried forward £1,052. Through running arrangements with the L.C.C. tramways have been extended, and the company's cars now run to Euston, Holborn, and Smithfield. The following is a summary of particulars relating to traffic:—Mileage open, 56.25 miles; number of passengers, 94,426,011; car miles run, 12,225,429; average receipts per car mile, 9.31; average receipts per passenger, 1.209; number of cars in stock, 312.

London and Suburban Traction Coy.—The revenue for the thirteen months ended December 31 last, included the dividends and interest receivable upon its investments in and loans to the subsidiary companies, amounted to £105,370. These companies were the Metropolitan Electric Tramways, London United Tramways, Tramways (M.E.T.) Omnibus and South Metropolitan Tramways and Lighting, and the Gearless Motor Omnibus. After deducting all expenses chargeable to revenue, including debenture and loan interest, there remains a balance of £88,252. Out of this balance the 5 per cent. dividend on the preference shares has been paid, leaving a balance of £8,507, which the directors propose to carry forward. The directors anticipate that the income of the company from investments will be considerably larger in future years, especially as the omnibus fleet was not in full service until August last.

London United Tramways.—The report for the year shows that gross receipts amount to £337,193. Adding the balance brought forward and deducting all expenses, including an appropriation of £20,000 to the reserve for reconstruction and renewals, there remains £14,600. The directors recommend a dividend on the preference shares at the rate of 1 per cent. per annum, leaving to be carried forward the balance of £2,100. Expenditure during the year to the amount of £12,825 has been charged to the reserve for reconstruction and renewals and £2,636 to general reserve. The gross traffic receipts show an increase of £5,662. Owing, however, to the increased cost of coal and material, and to special expenditure on permanent way and overhaul of rolling stock, the net profits show a decrease of £5,635. The directors mention that during the year they had made a substantial increase in the rates of pay of conductors. The mileage now open is 53.5 miles. During the year 12,645,125 passengers were carried and 9,407,226 car miles were run. The average receipts per car mile was 8.55d. and per passenger 1.26d. The company now has 338 cars.

Llanelly and District Lighting and Traction Company.—Subscriptions were invited on March 12 for 15,000 6 per cent. cumulative preference shares of £1 each, at par, of the Llanelly and District Electric Lighting and Traction Company, Limited, for the purpose of repaying temporary borrowings for extensions to the power plant required to cope with the increased demand, and for working capital. According to the prospectus the profits, before charging debenture and loan interest, have been:—1911, £6,170; 1912, £8,571; 1913, £10,137. The directors anticipate that for 1914 they will exceed £12,000. Debenture interest will absorb £3,050, leaving available for dividends, reserves, etc., £8,950.

WEEKLY TRAFFIC RETURNS.

Official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended March 14 gave total receipts of £221,631, or £10,038 more than in the corresponding week last year. The total length of track was 2,803 miles, or 24 more than for the corresponding week. Receipts were at the rate of £77 8s. 3d. per track mile, an increase of £3 2s. 1d. as compared with last year.

COPPER AND ALUMINIUM MARKET.

March 20, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton:—

	Friday, March 20.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	64 2 6	63 0 0 ..	64 5 0
,, ,, (three months)	64 11 3	63 10 0 ..	64 15 0
Electrolytic Copper—bars or ingots ..	66 15 0	65 15 0 ..	63 0 0
Aluminium—bars or ingots	83 0 0	83 0 0 ..	86 10 0

COAL MARKET.

March 20, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows:—

	Friday, March 20.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	
Best Admiralty Welsh (large)	22 9 ..	23 6 ..	24 9 ..	
Best Seconds	22 3 ..	23 0 ..	24 3 ..	
Ordinary Drys	20 0 ..	20 6 ..	23 0 ..	
Best Washed Nuts	21 0 ..	21 0 ..	22 0 ..	
Best Washed Peas	19 6 ..	19 6 ..	20 6 ..	
Cardiff, f.o.b.—				
Best Admiralty (large) ..	18 3 ..	17 0 ..	19 9 ..	
Best Seconds	17 9 ..	18 6 ..	19 3 ..	
Ordinary Drys	15 6 ..	16 0 ..	18 0 ..	
Best Washed Nuts	16 6 ..	16 6 ..	17 0 ..	
Best Washed Peas	15 0 ..	15 0 ..	15 6 ..	
Newcastle, f.o.b.—				
Best Steams	14 0 ..	14 0 ..	16 0 ..	
Best Seconds	11 6 ..	11 6 ..	14 0 ..	
Smalls	7 9 ..	7 9 ..	10 9 ..	

Owing to the miners' strike there were no quotations.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregate. Wks.	Aggregate. 1913-4.	Aggregate. Increase or Dec.
Anglo-Argentine	Mar. 11	£58,671	£59,392	10	£573,010	+ £20,408
Auckland..... (28 days)	Feb. 18	20,117	23,552	34	159,090	— 439
Ballarat and Bendigo	Jan.	5,164	5,075	42	39,650	— 818
Brazilian St. Rly. Mlrs	Jan.	46,268	54,689	26	319,153	+ 54,032
Brazilian Traction.....	Mar. 15	92,608	96,023	11	1,015,283	+ 68,897
Brisbane	Feb.	22,860	25,260	8	53,590	+ 5,920
British Columbia .....$	Jan.	743,271	777,102	31	5,330,828	+ 336,733
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacroze..	Feb.	40,824	40,877	34	356,923	+ 8,140
Calcutta.....Rs.	Mar. 14	64,660	67,630	10	7,54,298	+ 35,178
Cape Town	Feb	...	13,342	...	...	...
Carthagena & Herreria	Feb.	8,653	2,919	8	5,695	— 622
Cordoba.....	Jan.	11,899	12,735	43	133,055	+ 11,904
East India	Feb.	1,822	1,701	30	13,518	+ 516
Kalgoorlie.....	Feb.	2,644	2,169	8	4,509	— 779
La Plata.....	Feb.	4,942	4,758	8	10,062	— 455
Lima.....	Sept.	2,660	34,110	39	300,647	+ 23,783
Lisbon ..... Mlrs.	Jan.	...	156,175	4	126,175	...
Madras (14 days) Rs.	Mar. 15	26,827	29,347	10	139,279	+ 11,866
Melbourne	Dec.	...	69,000	...	...	...
Mexico .....$	Jan.	561,635	579,361	4	285,348	— 6,028
Montevideo.....	Feb.	34,368	35,8·5	17	137,901	+ 1,363
Para	Mar. 15	4,498	3,508	15	51,531	— 10,646
Port Elizabeth.....	Feb.	...	3,510	...	...	...
Shanghai .....$	Mar. 11	19,945	22,600	10	237,400	+ 39,039
Singapore .....$	Mar. 14	11,956	12,724	10	133,841	+ 8,567
Toronto .....$	Jan.	776,928	847,945	4	847,945	+ 71,017
Winnipeg.....$	Jan.	351,497	382,670	4	382,670	+ 31,173

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Wks	Aggregate. 1913-4.	Increase or Dec.
Aberdeen Corporation..	Mar. 11	£1,337	£1,493	+ £156	41	£65,627	+ £3,754
Accrington Corp.	,, 11	520	544	+ 24	49	28,154	+ 2,425
Ayr Corporation	,, 14	196	233	+ 37	43	15,786	+ 2,291
Bath Electric	,, 11	702	717	+ 15	10	7,057	+ 116
Birkenhead Corp.	,, 15	1,123	1,213	+ 90	50	64,414	+ 5,802
Birmingham Corp.	,, 14	11,331	12,288	+ 957	50	596,838	+ 50,186
Blackburn Corporation	,, 11	1,231	1,127	— 104	50	61,483	+ 5,200
Blackpool Corporation	,, 12	493	568	+ 75	48	82,626	+ 12,735
Bolton Corporation	,, 15	2,516	2,615	+ 99	50	136,271	+ 7,507
Bournemouth Corp.	,, 18	1,601	1 655	+ 54	50	101,287	+ 9,756
Bradford Corporation..	,, 14	5,112	5,825	+ 713	50	294,645	+ 18,949
Brighton Corporation	,, 15	786	803	+ 17	50	52,710	+ 3,121
Bristol	,, 13	6,762	7,396	+ 634	10½	75,680	+ 5,371
British Elec. Federatn	,, 13	40,139	49,998	*	...	...	...
Burnley Corporation ..	,, 14	1,523	1,770	+ 247	50	84,539	+ 8,564
Burton-on-Trent Corp.	,, 15	271	276	+ 5	50	14,689	+ 783
Bury Corporation	,, 15	1,232	1,280	+ 48	50	63,982	+ 2,526
Cardiff Corporation	,, 7	2,487	2,661	+ 174	49	132,649	+ 12,211
Chatham and District..	,, 12	791	811	+ 20	10	8,120	— 253
Chesterfield Corp.	,, 12	232	249	+ 17	49	12,834	+ 1,370
Colne & Trawden	,, 14	241	250	+ 9	10	2,606	+ 110
Cork Electric	,, 12	437	447	+ 10	10	4 470	+ 35
Croydon Corporation ..	,, 6	1,473	1,591	+ 118	48	79,351	— 5,835
Darlington Corporation	,, 14	225	241	+ 16	50	12 440	+ 1 134
Derby Corporation	,, 14	883	949	+ 61	50	48,826	+ 4,330
Dover Corporation	,, 14	194	199	+ 5	50	11,929	+ 103
Dublin & Lucan	,, 12	119	114	— 5	9	1,038	— 21
Dublin United	,, 13	5,302	5,264	— 38	11	53,428	— 2 356
Dundee City	,, 11	1,188	1,211	+ 23	43	56,049	+ 3,750
East Ham Corporation	,, 14	1,099	1,012	— 87	50	51.603	- 2,466
Exeter Corporation	,, 13	272	293	+ 21	50	16,739	+ 773
Gearless Motor 'Buses.	,, 14	...	447	...	11	4.699	...
Glasgow Corporation	,, 14	19 305	20,117	+ 812	41	837,235	+ 58,343
Glosmop(U.Elec.Supply)	,, 14	121	122	+ 1	11	1 317	— 4
Halifax Corporation	,, 10	1,798	1.840	+ 42	49	102,787	+ 3,935
Hastings & District.	,, 11	746	758	+ 12	10	7,022	— 44
Huddersfield Corp.	,, 14	2,004	2,080	+ 76	50	102,234	+ 5,531
Hull Corporation	,, 14	3,015	3,209	+ 194	50	158,348	+ 8,132
Ilford U.D.C.	,, 14	428	451	+ 23	49	22,395	— 820
Ilkeston Corporation	,, 18	120	127	+ 7	51	6,683	+ 906
Ipswich Corporation	,, 14	357	370	+ 13	50	22,293	+ 763
Isle of Thanet	,, 14	310	307	— 3	24	7.973	+ 612
Kilmarnock Corp.	,, 14	153	156	+ 3	43	7.553	+ 484
Lanarkshire	,, 12	1 521	1,821	+ 300	10	18,453	+ 2,402
Lancashire United	,, 11	1,335	1,512	+ 177	10	15,334	+ 2,030
Leeds City	,, 14	7,595	7,956	+ 363	50	404,188	+ 16,901
Leicester Corporation	,, 14	2,744	2,913	+ 169	11	29,052	+ 1,730
Leith Corporation	,, 14	634	641	+ 7	43	30,471	+ 1,435
Leyton U.D.C.	Feb. 19	1,134	1.236	+ 102	46½	61,933	+ 142
Liverpool Corporation..	Mar. 14	12,999	12,729	+ 730	10	132,425	+ 7,011
Llandudno &Colwyn B.	,, 13	166	163	— 3	15	2 264	— 1
London County Council	,, 11	40,674	42,249	+ 1 615	48	2,080,562	+ 16.525
London Gnl. Omnibus.	,, 14	56,826	52,998	— 3,828	11	597,375	+ 1,000
London United	,, 13	5,494	5,437	— 57	11	55.515	+ 990
Lowestoft Corporation	,, 14	128	149	+ 21	23	4.204	+ 394
Maidstone Corporation	,, 12	160	169	+ 9	50	9,779	+ 647
Manchester Corp.	,, 14	16,523	17,101	+ 578	50	874,140	+ 37,493
Met. Elec. Trys.	,, 13	8,531	8,632	+ 101	11	84,573	+ 325
Nelson Corporation	,, 14	176	200	+ 24	50	10,354	+ 588
N'castle-on-Tyne Corp.	,, 14	4,726	4,880	+ 154	50	245,125	+ 21.930
Newport (Mon.) Corp.	,, 14	761	754	— 7	50	38,300	+ 2.543
New St. Helens & Dist.	,, 11	744	771	+ 27	37	21,833	+ 2.666
Northampton Corp	,, 13	501	537	+ 34	50	28,448	+ 1,676
Nottingham Corp.	,, 13	3,093	3,232	+ 151	49½	165,190	+ 7,158
Oldham Corporation	,, 15	2,028	2.147	+ 119	51	112,058	+ 7,715
Portsmouth Corp.	,, 14	1,691	1,886	+ 195	50	110,723	+ 7,498
Preston Corporation	,, 11	762	826	+ 64	50	43,875	+ 2,695
Provincial	,, 14	1,565	1,592	+ 27	23	40,130	+ 2,203
Reading Corporation ..	,, 12	602	668	+ 66	49	34 331	+ 2,415
Rochdale Corporation	,, 14	1,405	1,438	+ 33	50	79,160	+ 3,193
Rotherham Corp.	,, 18	870	883	+ 13	50	50,541	+ 9,839
Salford Corporation	,, 16	4,761	5,060	+ 299	50	290,820	+ 12 222
Sheffield Corporation	,, 15	7,095	7,528	+ 433	51	375,344	+ 27,103
Southampton Corp.	,, 11	1,131	1,173	+ 42	49	64,327	+ 3,463
Southend-on-Sea Corp	,, 11	681	714	+ 133	50	45,344	+ 7,846
South Met. Trys.	,, 13	730	956	+ 226	11	10,093	+ 2,795
South Shields Corp.	,, 14	640	683	+ 43	50	35,846	+ 4,100
Sunderland Corp.	,, 15	1.298	1 355	+ 57	50	71,800	+ 6,335
Sunderland District	,, 11	528	534	+ 6	19	10.702	+ 1,156
Swindon Corporation	,, 11	142	160	+ 18	49	8,140	+ 463
Trys. (M.E.T.) 'Buses	,, 14	1.650	7,855	+ 6,205	11	84.930	...
TynesideTrys.&Tmrds	,, 11	488	476	— 12	10	4.707	+ 148
Wallasey Corporation	,, 14	1,022	1,102	+ 80	50	60 015	+ 5,410
Walsall Corporation	,, 14	591	624	+ 33	11	6 426	+ 165
Walthamstow U.D.C.	,, 14	673	696	+ 23	50	36,907	+ 1,593
Warrington Corp	,, 12	442	442	Nil	50	23,036	+ 414
West Ham Corporation	,, 12	2,556	2 676	+ 120	49	124,487	+ 4.386
Wigan Corporation	,, 12	1,390	1,483	+ 93	49½	73,845	+ 6,538
Wolverhampton Corp	,, 18	1,049	1,071	+ 22	51	54,572	+ 2,701
Yorkshire (W. Riding)	,, 15	1,276	1,429	+ 153	11	15,677	+ 1,348

* From such of the services as were working both last year and this year the receipts show an increase of £924 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Wks.	Aggregate. 1914.	Increase or Dec.
Central London	Mar. 14	£5,242	£5,303	+ £61	11	£57,145	— £2,848
City and South London	,, 14	2.933	2,907	— 26	11	31,418	— 1,982
Liverpool Overhead	,, 15	1,591	1,568	— 13	11	17,980	+ 486
London Electric	,, 14	14,620	14,770	+ 150	11	161,255	+ 145
Mersey	,, 14	2.222	2.274	+ 52	11	24,940	+ 74
Metropolitan	,, 15	15,951	17.517	+ 1 566	11	196,469	+ 17,153
Metropolitan District	,, 14	13,587	13.190	— 397	11	145 297	— 227

The Tramway & Railway World can be obtained, post free, at the following rates:—

For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
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Tel. No.: 2948 Gerrard.
Telegraphic Address: "Tramigro," London.

AMBERLEY HOUSE, NORFOLK ST., W.C.

TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, March 20.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	70½ — 72½
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	— ⅛	4⅛ — 5⅛
5	Do. 5½% Cum. 2nd Pref.	...	4⅛ — 4⅝
100	Do. 4% Deb. Stk. Red.	...	92½ — 94½
100	Do. 4½% Deb. Stk. Red.	...	97 —100
100	Do. 5% Deb. Stk. Red.	...	95½ — 98½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 —106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅞ — 1
1	Do. 5% Cum. Pref	...	1/16 — 3/16
100	Do. 4½% 1st. Mort. Deb. Stock, Red.	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	...	86 — 88
10	Blackpool and Fleetwood Tramroad Co.	...	14 — 15
	Bombay Elec. Supply and Trams. Co., Ord.	...	13½ — 14½
10	Do. do. 6% Cum. Pref.	...	10¾ — 11½
100	Do. do. 4½% Db. Stk Rd.	...	94½ — 96½
$100	Brazilian Traction Light and Power Co. Lim.	— 3⅛	79 — 81
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	...	7¾ — 8⅛
5	Do. do. 5% Cum. Pref	...	4⅞ — 5⅛
100	Do. do. 4½% 1st Deb Stock, Red.	...	98 —101
10	Bristol Tramways and Carriage Co.	— ⅛	6¾ — 7¼
10	Do. do. 4% Cum. Pref.	— ⅛	7 — 7¼
100	Do. do. 4% Deb. Stock	...	100 —102
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	+ 1	114 —118
100	Do. Pref. Ord. Stock	— 1	101 —103
100	Do. 5% Cum. Perpetual Pref. Stock.	...	101 —104
100	Do. 4½% 1st Mort. Debs.	...	98 —101
40	Do. 4½% Vancouver Power Debs.	...	94 — 98
100	Do. 4½% Perpetual Cons. Deb. Stk.	...	93½ — 95½ xd
100	British Elec. Traction Co., Lim., 6% Cum. Pref.	...	89 — 92
100	Do. 7% Non-Cum. Pref.	...	56 — 59
10	Do. 6% Pref. Ord. Non-Cum.	...	15½ — 17½
100	Do. Deferred Ord. Stock	...	6½ — 8½
100	Do. 5% Perpetual Debenture Stock	— 1	96 — 99
100	Do. 4½% Second Debenture Stock, Red.	...	80 — 83
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	73 — 78
100	Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb.	...	100 —102
5	Calcutta Tramways Co., Limited. Ord.	...	6¼ — 6½
5	Do do. 5% Cum. Pref.	...	5 — 5¼
100	Do. do. 4½% 1st Deb. Stock, Red.	...	96 — 99
1	Cape Electric Tramways, Ld.,	...	5/8 — ¾
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	3 — 3¼
100	Do. 5% Debs., Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co. (1904), Lim.	...	5¼ — 5¼
100	Do. 4% Debenture Stock Red, 1985	...	91 — 96
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.	...	89 — 93
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	...	90 — 93
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	— 6⅞
10	Dublin United Trams. Co. (1896) Lim. Ord.	...	— 11⅞
10	Do. do. 6% Pref.	— 1/16	— 12⅝
100	Do. do. "A" Red.	...	— 81
100	Do. do. Deb. Stock "B" Red.	...	— 79
10	Gateshead & Dist Trys. Co., Ord.	...	8¾ — 9¾
10/-	Hastings & Dist. Electric Trams. Co., Ld., Ord.	...	3/16 — 5/16
1	Do. do. 6% Cum. Pref.	...	1/16 — 3/16
100	Do. do 4½% Deb. Stk. Red.	...	67 — 72
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	93½ — 97½
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)	...	88 — 90
10	Imperial Tramways, Ord.	...	3 — 3¼
10	Do. do. 6% Cum. Pref.	+ ¼	6¼ — 6¾
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.	...	2 — 2¼
100	Do. 4% Debenture Stock	...	71 — 76
1	Kalgoorlie Elec. Trams., Ltd.	...	0 — 1/16
100	Do. do. 5% "A" Deb. Stk.	...	85 — 90
100	Do. do. 6% "B" do.	...	10 — 20
7/8	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.	...	⅜ — 1
10	Lanarkshire Tramways Co.	...	9¾ — 10¾
100	Lancashire United Tramways. 5% Prior Lien Deb.	...	86 — 88
1	Lisbon Electric Trams., Lim., Ord.	...	1⅛ — 1⅜
1	Do. 6% Cum. Pref.	...	1⅛ — 1⅜
100	Do. 5% Mort. Debs.	...	91 — 96
1	London and Suburban Trac. Co., Lim., Ord.	— 1/32	3/32 — 5/32
100	London General Omnibus Company, Limited 4½% Deb.	...	97½ — 99½
100	Do. Do. 5% Cum. Inc. Deb. Stk. Red.	...	89 — 92
100	London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red	— 1½	62 — 65
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref.	...	5 — 5¾
5	Do. do. 5% Deb. Stk., Red.	...	101 —103
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	79 — 82
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	...	103 —112 xd
$1,000	Do. do. 5% Bds.	...	99¼ —100¼
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	1/16 — 1/8
100	Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red.	— 1	89 — 92
100	Do. 5% Deb. Stock, Red.	...	88 — 91
100	Mexico Tramways Co., Common Stock	...	68 — 71
500	Do. Gen. Con. 1st Mort. Gld. Bonds	— 3	77 — 81
100	Do. 6% 50-yr. Mort. Bonds	— 4½	76 — 80
...	Michigan United Railways 5% 1st Mort. Gld. Bonds	...	91½ — 93½
100	Montreal Street Railway, Sterling 4½% Debs. (1922)	...	98 —100
100	Do. 4½% Sterling Debs, (1922)	...	99 —101
1	National Steam Car Co. Ltd.	...	1/16 — 1/8
10	Oldham—Ashton and Hyde Elec. Ord.	...	6 — 6⅛
10	Do. do. 5% Cum. Pref.	...	5¾ — 6
5	Para Elec. Rlys. and Ltg. Co., Ord.	— ⅛	4¼ — 4⅞ xd
5	Do. do. 6% Cum. Pref.	...	4½ — 4⅝
1	Perth (W.A.) Elec. Trams.. Ld., Ord.	...	—
1	Potteries Electric Traction Co., Ltd., Ord.	...	3/16 — 5/16
1	Do. 5% Cum. Pref.	— 1/32	1/16 — 3/32
100	Do. 4½% Debenture Stock, Red.	...	84 — 87
1	Provincial Tramways, Lim., Ord.	...	1/16 — 1/8
10	Do. 5% 1st Deb. Stock	...	95 — 98
...	Puebla Tramway, Light & Power Co., Prior Lien 5%	— 3⅛	76 — 81
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.	...	5 — 5⅛
100	Do. do. 4½% 1st Mt. Db. Stk.	...	95 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	89 — 91
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	— 1½	93½ — 95½
100	Do. do. 5% 50-yr. Mort. Gold Bonds	— 1	96 — 98
100	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	...	98 — 99
$50	Do. 5% 1st Mort. Debs., Red., 1939	...	98 — 99
10	Shanghai Elec. Construction Co.	...	19¾ — 19¾
100	Singapore Elec. Tramways Lim., 5% Debs. Red	...	89 — 92
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref.	...	3/16 — 5/16
100	Do. do. 4% Deb. Stk.	...	66 — 70
..	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	95 — 97
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	98 —100
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	83 — 85
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	93 — 95
5	United Elec. Tramways of Monte Video, Ord.	...	4⅝ — 5⅛
5	Do. do. 6% Cum. Pref.	...	4⅞ — 5⅛
100	Do. do. 5% 1st Deb. Stk. Red.	...	95 — 98
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	93 — 95
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	1/16 — 3/16
5	Do. do. 6% Cum. Pref.	...	4 — 4¼
100	Do. do. 4½% 1st Deb. Stock. Red.	+ 2	83 — 86

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THE

Tramway & Railway World

Vol. XXXV. No. 16.] LONDON, SATURDAY, MARCH 28, 1914. [Established in 1892.

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

CORPORATION OF BOOTLE.

TO ELECTRICAL CONTRACTORS.

The Corporation of Bootle invite tenders for the supply of the following plant at the sub-stations indicated in the specification:—

Two 500-600 kw. Rotary Converters, Transformers and Switchgear.

Tenders, on forms to be obtained at the Borough Electrical Engineer's Office, Electric Light Station, Pine Grove, Bootle, and endorsed "Tender for Electric Light Station Plant," to be delivered at my office not later than 12 o'clock noon on Wednesday, April 22, 1914.

The Corporation do not bind themselves to accept the lowest or any tender, or to defray any expenses incurred by the persons tendering.

By order, J. HENRY FARMER,
Town Clerk.

Town Clerk's Office, Bootle,
March 23, 1914.

CITY OF GLOUCESTER.

The Electricity and Tramways Committee of the City of Gloucester will be pleased to receive tenders for the supply of .1 × .1 × .05 Low Tension, Paper-insulated, Lead Sheathed, Steel Tape Armoured, Triple Concentric Cable, for a working pressure of 660 volts, the cable to be constructed in accordance with the specification of the British Engineering Standards Committee.

The successful tenderer will be required to execute a formal contract drawn up by the Town Clerk containing the Corporation fair wages clause, and such other provisions as may be deemed necessary for the due performance of the contract.

Particulars may be obtained on application to the undersigned on or before April 1, 1914.

F. H. CORSON,
City Electrical Engineer.

Electricity Works, Commercial Road, Gloucester.

BOROUGH OF PORTSMOUTH.

ELECTRICITY SUPPLY EXTENSION.

Tenders are invited for the supply and erection of a 2,000 kw. Turbo-Alternator complete with Circulating and Air Pumps.

Specification and conditions, together with forms of tender, can be obtained from the Engineer and Manager, Electric Lighting Station, Gunwharf Road, Portsmouth, on payment of a fee of £3 3s., which will be returned on receipt of a *bonâ-fide* tender.

The Portsmouth Town Council do not bind themselves to accept the lowest or any tender, and the contractor whose tender is accepted shall enter into a formal agreement, with sureties, for the due performance of the contract.

Sealed tenders, endorsed "Tender for Turbine Plant," must be delivered to the undersigned.

G. HAMMOND ETHERTON,
Town Clerk.

Town Hall, Portsmouth,
March 27, 1914.

COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

The Electricity and Tramways Committee of the County Borough of Warrington invite tenders for one year's supply of Motors and Transformers.

Specifications and forms of tender, etc., may be obtained from the undersigned on payment of one guinea for each specification, which will be returned on receipt of a *bonâ-fide* tender. Five shillings per copy will be charged for extra copies of either specification.

Tenders, addressed to the Chairman of the Electricity and Tramways Committee, Town Hall, Warrington, must be sealed with wax and endorsed "Tender for Motors, etc.," as the case may be, and delivered not later than 12 o'clock noon on Tuesday, April 14, 1914.

The lowest or any tender will not necessarily be accepted.

F. V. L. MATHIAS,
Borough Electrical and Tramways Engineer.

Howley, Warrington.

COUNTY BOROUGH OF WIGAN.

WIGAN CORPORATION ELECTRIC LIGHT DEPARTMENT.

The Electric Light Committee of the Wigan Corporation are prepared to receive tenders for the supply of:—

Electric Accessories (including Carbons and Carbon Brushes).
Brass and Iron Castings (including Service Boxes).
Rubber Cables.
Engine Room Stores.
Ironmongery.

Specifications and forms of tender may be obtained on application to Mr. Jo Slevin, Electrical and Tramways Engineer, Bradford Place, Wigan.

Tenders (endorsed with the name of the article tendered for), to be addressed to the Town Clerk, King Street West, Wigan, and must be received not later than Saturday, the 18th proximo.

The Corporation do not bind themselves to accept the lowest or any tender.

WILLIAM HENRY TYRER,
Town Clerk.

Town Clerk's Office, Wigan.
March 25, 1914.

COUNTY BOROUGH OF SOUTHEND-ON-SEA.

TRAMWAY UNIFORM CLOTHING.

The Corporation of Southend-on-Sea invite tenders for the supply of Motormen and Conductors' Uniforms.

For further particulars and form of tender apply to Mr. Robert Birkett, Borough Electrical Engineer and General Manager, London Road, Southend-on-Sea.

POSITIONS VACANT.

MAIDSTONE CORPORATION TRAMWAYS.

CHIEF CLERK.

The above Corporation invite applications for the position of Chief Clerk, at a commencing salary of 30s. per week. Apply, stating age, experience, and present occupation, accompanied by copies of not more than three recent testimonials. The envelope to be endorsed "Chief Clerk," to be sent on or before April 3, 1914, to A. T. Lambert, General Manager, Tonbridge Road, Maidstone.

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CITY OF YORK LIGHT RAILWAYS.

APPOINTMENT OF TRAFFIC SUPERINTENDENT.

Applications are invited for the position of Traffic Superintendent on the York Corporation Tramways system; salary under scale; commencing at £156 per annum, and advancing to £165, with a maximum of £175, in advances of £5 per annum.

Previous experience in the supervision of Tramways traffic is essential.

Applications, giving particulars of experience and qualifications, accompanied by copies of not more than three recent testimonials, are to reach the undersigned not later than Monday, April 6, 1914, and should be endorsed "Traffic Superintendent."

J. W. Hamp,
Engineer and Manager.

Offices:
Clifford Street and Friargate, York.

CHIEF INSPECTOR.

Opening for ambitious young fellow with practical knowledge and tact on small system. Full control of traffic staff and good opportunity of advancement for suitable man. Apply, stating age salary required, and full particulars of career, to Box 185, The Tramway and Railway World, Amberley House, Norfolk Street, London, W.C.

DEPOT FOREMAN.

Vacancy for smart, energetic Depôt Foreman, who has ability and experience of electric car maintenance. Strict disciplinarian, and six o'clock man required. Salary £150 per annum. Send full particulars of experience to Box 184, The Tramway and Railway World, Amberley House, Norfolk Street, London, W.C.

GANGERS.

Wanted for Lancashire town, two steady and competent men as Gangers. Must be well up in repairs and relaying of Tramway Track and able to control a large body of men. Good wages to suitable men. Address applications, Box 547, The Tramway and Railway World, Amberley House, Norfolk Street, London, W.C.

READING CASES
To hold 26 Saturday Issues of
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TRAMCAR METERS.
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WATERTIGHT FITTINGS FOR CAR SHEDS.
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Deutsche Ackley Bremsen Co., m.b.H. Charlottenburg 4-Berlin, Waitzstr. 7.
Cie. Francaise des Friens Ackley, 62, Rue St. Lazare, Paris.
BRANCH OFFICES AND AGENCIES Established at Brussels, Christiania, and Stockholm.

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THE
Tramway and Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
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One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, MARCH 28, 1914.

THE "OCEAN"

ACCIDENT AND GUARANTEE CORPORATION, LTD.,

IS THE

PREMIER INSURER OF TRAMWAYS.

HEAD OFFICE:

MOORGATE STREET, LONDON, E.C.

EMPLOYEES' DUTIES AND RULES.

Apart from the issue of books of rules, in which conductors are no doubt reminded that it is their duty to keep a good look out and to maintain a courteous attitude towards the patrons of the cars, apparently no attempt has been made to prepare a handbook embodying friendly counsel, such as is available for men in many other occupations. Judging from the papers and discussions dealing with various phases of welfare work at meetings of tramway managers in the United States, the matter is one that engages more attention there than on this side of the Atlantic. That circumstance is no doubt due to the fact that in America the employees do not settle down to long service. The extent to which work on the cars is regarded as a lifetime occupation here is shown by the statement lately made at a meeting of the Cardiff Tramway Committee that 95 per cent. of the men have been in the service since the undertaking was taken over from the company. The inculcation of courteous habits is especially necessary in these days, when so much discourtesy is manifest among the public, as is shown by the demeanour of some car passengers towards each other and to the conductors. Testimony on the latter point was given by a deputation from St. Pancras to the Highways Committee of the London County Council. The main object of the interview was to ask for concessions regarding the car services, but a suggestion was also made that some of the employees might show more courtesy, though the deputation expressed their "appreciation of the kindly manner in which the majority of conductors and drivers performed their duties under difficult and trying circumstances." There are many conductors whose conduct is a standing example to the public. The conductor who approaches a passenger with a cheerful "Fares, please!" and "Thank you" when he has punched the ticket, makes his round of the car in less time than is taken by the man who shakes his money-bag and utters not a word. The courteous man is generally more efficient, as he is able to spend more time on the platform looking for people who hail him and seeing that passengers alight in safety. Some of the men, too, need to be reminded that the whistle must always be used on top decks where bell-pulls are not fitted. There is too much tendency to rap the window with a coin or to stamp on the deck. Complaint was recently made by a member of a tramway committee of a city that a conductor had roughly pushed his wife off the step of a car. When the manager replied that it was not fair to him as manager that the member did not report the man, so that he could pursue his policy of weeding out such men, the alderman stated that he once reported a man and the report cost him his election. In view of the manager's further statement that working men are more careless of their duties to-day than ever, and that it is hardly safe to speak to some of them, it is evident that very severe procedure is required to meet this weak point in municipal tramway administration. Upon satisfactory evidence being forthcoming a man ought either to be warned or dismissed. An interesting point is being discussed by an Aberdeen newspaper concerning a rule that no tramway employee must visit licensed premises in uniform, no matter whether on or off duty. It is asserted that most of the other towns where a similar rule was made applicable have dropped it. In London, we may observe that it is a common occurrence to see men off duty ride on a car from a depôt to their homes and go into a public house on leaving the car. Perhaps it is as well not to apply the rule to men who are not on duty, for of late years even the police have been permitted to smoke when going to and from their homes, and some of them may be seen to enter public houses. No sympathy will be felt for a few of the Wallasey employees who are stated to be agitating against the new scheme of duties, which enables them to enjoy a six days' week with a minimum of 60 hours' work. They complain that they do not now receive quite so much overtime pay, but the manager's reply to an interviewer is that the department is enabled to employ more men. The loss of overtime would appear to be recouped by the new scale of bonuses. Under this scheme an aggregate sum based on bonuses ranging from 9d. to 3s. per week is paid to the men when they are given a week's holiday, for which they also receive pay. The manager further states that some of the men say they do not want overtime, while others are desirous of putting in extra duty. Moreover, he is willing to accommodate both sections if they express the desire direct. This is a course that the men themselves ought to have adopted, instead of attempting to raise an outside agitation.

ALL-NIGHT CARS.

The announcement is just made that a sub-committee of Glasgow Corporation are about to submit a recommendation in favour of the running experimentally of all-night cars in that city. It has to be remembered that the area served by the Glasgow tramways has now a population of about one million. The tenement system obtains to such a large extent in Glasgow that the mileage of tramways required to serve a certain population is comparatively small; but so many suburbs and even adjacent towns are

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connected with the centre of the city by tramway, that the problem of conveying people homewards late at night or early in the morning is of importance. An agitation has been afoot for some time in favour of all-night cars, and apparently the experiment is to be tried. It is not at all likely that any profit will be made on these all-night cars; more probably there will be a loss, but as the Glasgow tramway undertaking as a whole is in such a prosperous condition, some of the surplus revenue may better be devoted to this useful object than to further reductions in fares. The tyrannical licensing laws which prevail in Scotland will, of course, militate against the success of the all-night cars. Even if public-houses are left out of the question, the fact that restaurants and hotels must bar the door against all except lodgers at 10 o'clock, leads to the streets becoming deserted at an hour much earlier than is the case in English cities. Probably the first experiment ever made in all-night tramway service was in New York, where all-night cars were started in the Broadway about the year 1895. As the cars were run at that time by cable traction, it was necessary to go to the expense of providing conduits and sheaves for two cables in each conduit, so that examination and repair of the ropes might go on while the cars were running. Even in New York at that time the all-night cars did not seem to be largely patronised after midnight. Then came London. The London Tramways Company—one of the most efficient and energetic tramway companies that the country has ever seen—instituted an all-night service of cars on certain of its routes in 1897 or 1898. The step was certainly a peculiar one, in view of the fact that within a few months afterwards the tramways passed by purchase into the hands of the London County Council. The transfer took place in the end of 1898. Ever since then the County Council have run all-night cars, and extended the service. It is admitted, however, that it is run at a loss; but the reason for the loss is the special one that from about half-past one in the morning everybody is carried at workmen's fares, viz., one penny for any distance beyond the half-penny stages, while a two-penny return can be obtained. The remaining instance in this country is that of Manchester where an all-night service was recently begun. It does not appear, so far, that much traffic is being obtained after midnight, but Manchester also can well afford the boon for late workers. No doubt the regular patroniser of social entertainments benefits by such services also, but the real consideration of the tramway authority ought to be given to the large class of men who, in all great cities, have to work till far into the night, and to others who are on night duty, and have to go home at an hour in the morning when ordinary tramway services are discontinued.

Rolling Stock at West Ham.—After consideration of a report by Mr. J. S. D. Moffet, the general manager, the West Ham Tramways Committee have recommended: (1) That fifteen top-covered bogie cars (London County Council type) be purchased immediately, and if desirable a new single truck, rigid wheel-base, covered car; (2) that the Council standardise, as far as possible, on two classes of cars, with standard trucks, equipments, and bodies, on the following lines:—Class A: A single truck, rigid wheel-base, top-covered car, with seating accommodation for sixty passengers. Class B: Bogie cars of the London County Council type, with seating accommodation for seventy-eight passengers; the motor equipment for the smaller cars to be not less than 35 b.h.p. per motor, and for the larger cars not less than 45 b.h.p. The committee advise that the present stock of cars and equipments shall be gradually brought into line with the above-mentioned standards as opportunity arises, or replaced as circumstances require, and that arrangements be made as early as possible to replace with standard apparatus seventy controllers, which differ in operation from the majority in use on the system.

MANCHESTER TRAFFIC PROBLEM.

Manchester Tramways Committee on March 23 had under consideration the report presented by Mr. J. M. McElroy, general manager of the tramways, as a result of the tour made by himself and Mr. Mattinson, the permanent way engineer, to study traffic conditions in the chief cities of the United Kingdom, Europe, and America. The committee expressed their thanks to Mr. McElroy for the admirable report he had prepared, and it will be presented to the City Council next week. Subsequently, at the request of the Watch Committee, Mr. J. H. Thewlis, their chairman, and the Chief Constable, will leave for the United States to report upon the methods of dealing with traffic congestion there.

A report on the best means of meeting traffic congestion in the future is also being prepared by the Improvements Committee.

Mr. McElroy's report is a long and comprehensive document, well arranged and splendidly illustrated. It contains a large number of maps and diagrams relating to tramways and local railways in many cities both in Europe and in America. There are also numerous and excellent reproductions of photographs showing types of underground and elevated railways. For convenience of reference the report is not only divided into sections, but is distinguished by numerous sub-headings. All these sections and sub-headings are shown in an elaborate contents, so that there is not the slightest difficulty in referring to any point that is required.

The main proposals submitted by Mr. McElroy include the construction of six additional arterial routes, the provision of tramway terminals: (1) on the old Infirmary site; (2) in Albert Square and St. Peter's Square; (3) in High Street; (4) in Cannon Street, at the junction of Corporation Street, and an improvement in the present facilities at the Stevenson Square terminal; the opening up of negotiations with the Corporation of Salford as regards the tramway traffic entering the city from the Salford side; and the introduction on a limited scale of transfer tickets, to enable passengers to travel from the tramway terminals to certain points in the city centre by changing cars. The streets in the centre of the city are so badly laid out for traffic purposes that a determined effort should be made to effect some improvement, and the following proposals are submitted: A proposed new street connecting St. Peter's Square with Albert Square—forming a continuation of Oxford Street; and a widening of Fountain Street from Market Street to Princess Street, and of Cooper Street from Princess Street to the above-named new street.

The report advances the following conclusions among others:—"That in all cities and towns there is an immense potentiality in the riding habits of the people. Everywhere there is a continual growth in the number of journeys per head of the population, and the provision of new or improved transit facilities accelerates this growth in a very marked degree.

"That, on account of the great initial cost, the construction of underground rapid transit lines cannot be justified unless there is a very large volume of traffic to be dealt with; that, speaking generally, underground subways for tramcars are an unjustifiable expense, owing to the comparatively small number of passengers it is possible to pass through them by single or double unit cars. Underground lines, if they are to be placed upon a paying basis, must be worked by high-speed trains operated at a very close headway. This demands a great deal of traffic.

"It cannot be too strongly emphasised that the future passenger transportation of the city will be best met by the rapid-transit system being so laid on that it can be 'dovetailed' into the tramway system, and the two worked as a combined system. Hence the necessity of the scheme for the rapid-transit lines being prepared by the Corporation. The provision of tramway subways to relieve traffic congestion within the central area are not justifiable on account of the great cost of their construction and the relatively small amount of traffic which could be passed through them. Subways should be constructed for use only as rapid-transit lines."

Mr. McElroy states that while he has come to the conclusion that the time is not ripe for the immediate construction of rapid-transit lines in Manchester, it is essential that detailed consideration should be given without delay to the planning of a general scheme to be constructed later on by instalments.

Among minor points which are to receive attention, and, if found advantageous, put into practice, are:—Improvements to the more rapid loading and unloading, and to the prevention of boarding and alighting accidents; number of stopping places to be reduced so as to increase the average speed of the cars; simplification of fare collecting; and the provision of island refuges and shelters. Mr. McElroy refers to the successful operation of payment on entry cars in the United States, and considers that if a simplification of fares can be introduced here the prepayment system might be adopted, thus reducing the number of boarding and alighting accidents.

On the question of motor omnibuses, he says that these vehicles will in the future form an important part of the surface-transit facilities; they will supplement the tramway services in many directions. Trackless trolley cars were undergoing considerable improvement, and there are circumstances which may warrant their introduction in outlying areas, especially if the operating costs continue to be lower than those of the motor omnibus.

"If the Corporation determines," he says, "to carry out the proposals outlined in this report, and if the revenue of the tramways department is to be relied upon to meet a large part of the expense entailed, it is of the utmost importance that steps should be taken to secure the department against unfair competition in the passenger transportation business of the city, and, if necessary,

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further statutory powers should be obtained with this end in view."

In a further reference to financial matters Mr. McElroy says that if the policy of fixing the committee's contributions to the relief of rates at 5 per cent. on the capital expenditure is continued, it will at once put an end to any proposals such as those outlined in this report. If the tramways department is to improve and develop the transit facilities of the city, a limit must be placed, at any rate for some time, upon the amount to be applied from the revenue in rate relief, say, not more than £100,000 per annum.

DEARNE VALLEY SCHEME SANCTIONED.

Subject to certain conditions, the Light Railway Commissioners have expressed their willingness to grant the application made by the Wombwell, Wath, Bolton, and Thurnscoe Urban Councils for powers to construct various light railways. After mentioning the withdrawal of the No. 6a scheme and the proposal to provide a generating station and depôt in connection with railway No. 13, the Commissioners state that sufficient case was not made out in support of railways No. 13 and No. 14 (Wath to Bolton). The construction of railway No. 8 must be suspended until a bridge which will carry the light railway has been substituted for the level crossing at Wath Staithe. Where it is proposed that the light railway, at the commencement of railway No. 5, should cross the Elsecar branch of the Great Central Railway on the level, the Commissioners consider that, having regard to the steep gradients on each side of the crossing, the light railway must be carried over upon a bridge. If arrangements can be made for a bridge on which the road would be carried as well this would clearly be preferable.

The Commissioners do not propose to grant to the promoters the powers asked for on railway No. 9. The construction of railways Nos. 15 to 19 will afford a direct access from Thurnscoe, Goldthorpe, and Bolton to the Manvers Main terminus of the authorised trackless trolley route of the Mexborough and Swinton Tramways Company; and if that company should agree with the promoters to lay down a light railway over that route as proposed (*i.e.*, railway No. 9), the Commissioners would be prepared to consider whether they could not give the company the necessary powers under the present application. They consider that the promoters' proposals for widening roads are sufficient, and that the interests of the respective owners of bridges are sufficiently protected.

With reference to the proposed junctions with existing lines at Barnsley and Swinton, the Commissioners think that the promoters should have powers to effect junctions with, and to make agreements as to running powers over them, but that they should not have compulsory running powers.

Powers are granted to enable the promoters to generate electricity for the undertaking, but the Commissioners believe that the Councils will be sensible of the advantage of obtaining electricity from other producers if they can arrange good terms either at this stage or afterwards. As at present advised the Commissioners would insert powers expressly authorising a supply by the Joint Board of the Councils, if their proposals for an Electric Lighting Order are realised; and they are disposed, subject to what has been said above, to allow a supply by the Corporation of Barnsley outside their own district, within certain limits and under certain conditions.

Notwithstanding that substantial losses will probably be sustained by the railway companies, the Commissioners recognise that the existing railways afford quite a different service from that of a light railway along the public roads. Although it is fair to say that the railways have done what they can for the passenger traffic, their lines have to be chiefly occupied with the important coal traffic of the district and the through goods traffic to the coast, and the Commissioners say it is not possible for them to give the facilities for which these light railways are required and designed.

The Commissioners do not consider it necessary that the proposals should be submitted to Parliament, but on this point they observe that a special discretion is reserved under the Light Railways Acts to the Board of Trade; and, if the Board should think otherwise, an opportunity for such submission is afforded under the Light Railways Act, 1912. In conclusion they state that the Councils may like to have the opportunity of further considering their proposals, and mention that before any Order is made by the Commissioners, the clauses necessary for the protection of parties interested will have to be considered and settled.

OBJECTIONS BASED ON THE TOTTENHAM RATING APPEAL.

In the course of his letter embodying the decisions of the Commissioners, their secretary (Mr. A. D. Erskine) says:—"On behalf of the railway companies the recent judgment of the House of Lords in the 'Tottenham Electric Tramways Case' was also referred to; and it was argued that the Commissioners had no jurisdiction to deal with the application for these light railways; and further that, inasmuch as the contribution to the general rate in respect of such lines as these, if promoted under the Tramways Act, 1870, would be upon a higher scale than if promoted under the Light Railways Acts, the other ratepayers (including the railway companies) would be placed at a corresponding disadvantage by the lower assessment under the light railway procedure. It appears to the Commissioners that the point for decision in the 'Tottenham' case was whether a tramway, to which the Tramways Act, 1870, is applicable, is entitled to be rated as a railway; and it was no part of the decision to the contrary then given that the term 'light railway' must be construed in so restricted a sense as to preclude the construction of light railways in accordance with modern methods upon public roads. I should add that, although anomalies are introduced by the existence of different procedures in the case of lines in other respects very similar, the Commissioners are not in a position to alter that, nor in the matter of rating to vary the dispositions of the general law. A further objection was taken on behalf of the Great Central Railway that the proposals in the draft Order as to the constitution and powers of the Joint Committee are not in accordance with the terms of the Light Railways Act, 1896; but the Commissioners think that it is not necessary to read these terms in such a way as to limit the validity of the Acts of a Joint Committee to the duration of a single year; and that they have the necessary powers to make provision under the Order enabling the scheme in the hands of a Joint Committee to be carried on under such conditions as have been agreed upon between the Councils."

A HULL DEPUTATION'S RECOMMENDATIONS.

TWENTY NEW CARS AND VESTIBULES FOR EXISTING CARS.

A deputation of the Hull Tramways Committee, accompanied by the city engineer and the tramways manager, have visited the Leeds, Bradford, Burnley, and Leicester tramways, the United Electric Company's Car Works, and the Brush Company's Car Works. The deputation reported to the Tramways Committee on March 25 that as far as tramcars were concerned they found nothing which could be looked upon as an improvement upon the type of car which is in use at Hull. They inspected types of vestibule cars in Leeds, Bradford, Burnley, Preston, and Loughborough, and a special construction described as a wind-screen in Leicester, the invention of the car superintendent there. A wind-screen, however, would not, in their opinion, serve their purpose in Hull so well as a vestibule end, which was made part of the fabric of the car. What they thought was the best type of vestibule for their purpose was something on the lines of those at Leeds, Bradford, and Burnley. The vestibule on the Burnley tramways was invented many years ago, and, having had a long experience behind it, might now be looked upon as having been a well-considered protective device. It afforded adequate protection to the motorman while it did not interfere to any extent with his hearing or seeing.

The committee recommended that twenty new cars to be purchased should be fitted with vestibules of the type referred to, with such modifications as might be necessary on reconsideration, and that steps should be taken as opportunity offered to have vestibules of similar type fitted to the existing cars, the work to be put in hand and carried out according to the convenience of the car repairing staff. They also recommended that the roof of the top cover of the new cars should be extended in the form of a canopy at each end to protect passengers sitting outside from the weather.

On the question of large *versus* small cars, they found the majority of tramway operators whom they consulted strongly in favour of the small standard car, such as was in use in Hull, as against the ponderous double-bogie car capable of seating between 70 and 80 passengers. The small car was, of course, easily handled by the motormen, and a strong argument in its favour was that the conductor had better control, and was more easily able to deal with his fare-collection than in the case of the larger car. It had to be borne in mind that with differential fares to be collected at short intervals it was very easy to give the conductor more work than he could possibly accomplish by increasing the number of passengers which a car can carry.

The committee decided that tenders be invited for the supply of 20 car bodies, 20 trucks, and 20 sets of equipment for new cars, the Mayor to open the tenders. It was also agreed that the Council be recommended to authorise the committee to accept tenders.

L.C.C. TRAMWAY MATTERS.

IMPROVEMENTS IN MOTOR GENERATORS

At last Tuesday's meeting of the London County Council the Highways Committee in their report referred to the fact that in April last year the Council had accepted a tender by Messrs. Newton Brothers, Derby, amounting to £7,087 10s. for the rewinding, etc., of seventeen 300 kw. motor generators at tramway sub-stations, and other works. Several of these machines had now been reconstructed and rewound, and a long series of tests had been made under actual tramway load conditions. Owing, however, to the improvements in the windings on the stator and armature it was found that a load of 400 kw. might be taken, provided additional windings were put on the field magnet coils, to reduce the temperature when the machine was at full pressure. The cost of adding extra coils to the seventeen machines would be about £634 19s. The Committee recommended that the additional windings be made, and that the work should be carried out by Newton Brothers as an extension of the contract. This course was approved.

MISCELLANEOUS.

The Committee announced the completion of the work of reconstruction on the conduit system of the tramways in Ball's Pond Road, between Southgate Road and Kingsland Road. The lines are now open for traffic.

The adjourned report regarding cost of new concrete foundations of part of the tracks of the London United Tramways was again brought up and was agreed to.

Mr. G. H. Hume, chairman of the Highways Committee, replying to a question by Mr. H. Gordon, said that there was a loss on the old horse lines in Burdett and Grove Roads estimated at £3,000

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up to October last, and that a further loss of nearly £4,000 was contemplated to the end of the current financial year.

Replying to Mr. J. D. Gilbert, who asked if police prosecutions had taken place against conductors for allowing excess passengers to stand on the upper decks of cars,

Mr. Hume said a summons had been taken out by the police against a conductor, and the hearing was adjourned. The man was defended by the trade union solicitor, and as the matter was *sub judice* he could not make a further statement.

Mr. Gilbert asked why the conductor was defended by his union solicitor instead of by the Council's solicitor.

Mr. Hume replied that this was according to the usual practice.

On the tramway estimates by the Finance Committee of sums to be paid out of the tramways account in respect of revenue and capital accounts,

Mr. H. H. Gordon moved a reduction of £5,000 in order to call attention to the loss entailed by the non-electrification of the Burdett and Grove Roads route, amounting to £8,000 a year. This annual loss was less than the difference between electrifying this line on the overhead or the conduit system, and he urged as a matter of finance that the Committee should take action at once, either by shutting down the horse service or meeting the wishes of the local authorities.

Mr. Hume replied that the Committee were acting on the advice of their officers, who said the electrification of the line on the conduit system would involve a loss.

Mr. Gordon: Less than you are losing now.

Mr. Hume said the Council had settled their policy in the matter, and it was for the Council and not the Committee to say what should be done in the matter.

On a division, Mr. Gordon's motion was defeated by 64 votes to 43.

MISCELLANEOUS NEWS AND NOTES.

The Colne and Trawden Light Railways were taken over by the Colne Corporation at midnight on March 24. Mr. T. G. Richardson was recently appointed manager for the Corporation.

Free Rides for the Blind at Derby.—Blind persons in poor circumstances, and who are accompanied by a fare-paying friend, have been allowed to travel free of charge on the Derby Corporation tramways.

Aberdare Tramways.—The Council have agreed to a rate for the next half-year which is a reduction of 2d. This is attributed largely to the unlooked-for amount of profit from the tramways and railless traction undertaking.

Illegal Use of Return Tickets.—At the instance of Exeter Tramways Department, a number of persons have been prosecuted for aiding and abetting other persons to use return halves of mid-day tickets. Fines were inflicted.

Underground Scheme for Lacroze.—J. G. White and Co. have presented to the Argentine Government for approval a scheme for the construction of an underground railway in Lacroze. The total length of the tunnel will be just over 10 km.

Track Reconstruction.—Shipley Urban Council, whose lines are leased to Bradford Corporation Tramways' Department, have decided to invite tenders for the reconstruction of the track on the Bradford Road, the Council to supply cement, etc. The estimated cost of the work is £8,305.

"Tramways Management."—A lecture bearing this title was given on March 23 by Mr. Idris Williams, of Pontypridd, to the South Wales and Monmouthshire Students' Society of the Institute of Municipal Treasurers and Accountants, at Cardiff. The chair was taken by Mr. J. Allcock.

Central Car Shed for Perth.—The Tramways Committee are recommending the Council to erect a car shed in King Edward Street, in order to save the dead mileage to Scone depôt, and also to enable a full service of cars to be put on more easily during wet weather, or when entertainments are taking place in the city.

The Institution of Automobile Engineers.—On Wednesday, April 8, at the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, S.W., at 8 p.m., Mr. H. E. Wimperis will read a paper, entitled "Accelerometer Tests." Cards of invitation to the meeting may be obtained on application to the Secretary of the I.A.E., 13, Queen Anne's Gate, Westminster, S.W.

Use of Rosettes at Brighton.—During the relaying of the tramways in York Place and London Road, Brighton, Mr. Wm. Marsh, the tramways engineer and manager, has removed several standards and attached the wires to rosettes fastened to houses. It is intended to adopt rosettes very largely in the installation of the railless trolley car system in such narrow streets as Western Road, North Street, and St. James's Street.

Private Bill Legislation.—Norwich Tramways Company's Bill was read a second time in the House of Commons on March 23. The tramways and electricity portions of the Chesterfield Corporation Bill were agreed to on March 25 by Mr. Middlebrook's Committee of the House of Commons. Mr. Jeeves, for the Corporation, said the tramway undertaking was a thoroughly sound one financially. All they were asking was power for widenings and cross-overs in two places.

No Halfpenny Fares at Salford.—By 26 votes to 9 the Corporation have rejected a proposal to instruct the Tramways Committee "to establish halfpenny fares on all short distance stages within the borough." Alderman Linsley, chairman of the committee, stated that of 50 million tickets issued last year 35 millions were penny ones. The penny ticket was the backbone of the undertaking. The adoption of the halfpenny stage might mean that the department would be unable to contribute anything to the rates. The committee were going to issue halfpenny single tickets instead of penny return ones to children.

All-Night Service and Reduced Fare Questions at Glasgow.—The Finance Committee of the Tramways Committee have agreed to recommend that an all-night service of cars be tried as an experiment in the autumn, as the summer months would not give a fair test, owing to the large number of persons who then reside out of the city. The general manager presented a report on the suggested extension of the penny stage from two to about three miles and the halfpenny stage from one mile to a mile and a half. Consideration of the report was adjourned.

Speed at Oldham.—In reply to complaints of excessive speed of cars in Manchester Road, Mr. Dugdale, the manager, has stated that the track had a gradient of 1 in 40 between the points named, and there was practically no curve in the lines. He was not going to say that some drivers did not travel at a greater speed than they had been instructed to do, but he would say without hesitation that a car would be safe if it were driven at 30 miles an hour from Heron Street to Chapel Road. The manager was instructed to examine the system, and report as to the number of stops needed.

Metropolitan Tramways and Local Taxation.—In view of the approaching issue to the House of Commons of the report of the departmental committee on local taxation, Mr. T. B. Goodyer, general manager of Croydon tramways, and hon. secretary of the Metropolitan Association of Tramway Managers, has made representations to the Chancellor of the Exchequer. Mr. Goodyer emphasised the need for "such legislation as will place motor omnibus operators on terms of equality with the municipal tramway authorities in the metropolitan area with regard to the public burdens the latter now have to bear."

CONTRACTS AND ORDERS.

Leyland Motors, Limited, have received an order from Accrington Council for a 30 h.p. motor tower wagon.

Dick, Kerr and Co., Limited, have received an order for four tramcars from Exeter Corporation tramways.

Crompton and Co., Limited, have been awarded a contract for the supply of a balancer to Luton Corporation, at £328.

E. Green and Son, Limited, have obtained a contract for fitting larger pipes to the economiser at Walthamstow electricity works.

British Westinghouse Company have had their tender accepted by Johannesburg Council for the supply of six 500 kw. rotary converters complete with switchgear, at £8,242.

PERSONAL.

Mr. H. H. Jowers, of Stockport, has been appointed mains and permanent way superintendent to Darlington electricity and light railways department.

Mr. C. H. Hume has been appointed chairman and Lord Monk Bretton vice-chairman of the Highways Committee of the London County Council for the ensuing year.

Mr. J. A. Lycett has been appointed chairman of the South Staffordshire Tramways Company, and Mr. B. Kingsford has been chosen to fill a vacancy on the board caused by the retirement of Mr. C. Shirefl Hilton.

Mr. R. F. Dixon on leaving Hull Corporation tramways to become works superintendent in Southampton Corporation tramways department, has been presented with a case of fish knives and forks and a silver cigarette case by the staff and employees.

Mr. J. W. Beauchamp, who was one of the selected candidates for the position of electrical engineer of Salford, has been recommended for an increase of his salary to £700 as from April 1, the future maximum to be £900, to be reached by annual increments of £100. He is to be asked to remain at Walthamstow for two years at least.

Mr. T. J. Kendrew, general manager of Southport Corporation tramways, has been recommended for an advance of £50 in his salary of £200. Prior to the amalgamation of the tramways and the electricity undertakings Mr. Kendrew was manager of the former, at £250 per annum. In May, 1913, he was appointed manager at £200 per annum, and the returns have shown an increase of £1,000 on those of the two previous years.

Salaries at Manchester.—The Corporation have adopted the recommendations made a month ago for the following increases of salaries:—Mr. J. Wood, assistant tramways manager, £500 to £600, by four annual increments of £25 each; Mr. J. T. Oakes, traffic superintendent, £475 to £500; Mr. J. A. Cookson, electric mains surveyor, £400 to £425; Mr. W. E. Foden, electricity department accountant, £425 to £450; Mr. F. E. Hughes, electricity department secretary, £475 to £500; Mr. E. Bolton, electricity substation engineer, £375 to £400.

Mr. J. Richardson, who has been appointed borough electrical engineer at Salford, is 38 years of age. During the twelve years he has managed the Dundee Corporation's undertaking he has carried out a scheme of reconstruction and reorganisation involving an expenditure of £26,000 which was met out of revenue. At a special meeting of the Council on March 23 it was agreed to offer him an increase of salary from £650 to £800, with increments of £50 a year until the maximum of £1,000 is reached. Mr. Richardson is also to be asked to remain at Dundee for five years. He is prepared, it is understood, to agree to the proposal.

FINANCIAL REPORTS AND MEETINGS.

The British Electrical Federation.—The traffic statement for the week ended March 20, 1914, shows that the receipts from tramways and railways amounted to £37,955, as compared with £37,375 in the corresponding week last year, and from omnibuses £12,206, as compared with £3,445, making a total of £50,161, as

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compared with £40,820. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year the receipts show an increase of £175 upon the week.

South Metropolitan Tramways Company.—Mr. J. Devonshire, in moving the adoption of the report on March 25, said that the profits for the year were £15,025, compared with £15,492. The balance available for distribution was £15,942, and it was proposed to place £5,000 to the reserve, to a pay a dividend of 6 per cent. on the preference shares, and to carry forward £775.

South Staffordshire Tramways Company.—At the annual meeting on March 23, Mr. S. R. Blundstone, who presided, said that the mileage and other rents had increased slightly, as had also the interest on investments and loans. There was a slight increase in expense of administration, and they had written off a small amount of depreciation on their investment in Belfast Corporation stock, though the depreciation had since disappeared. The income for the year amounted to £3,546, and they proposed to pay a dividend of 3½ per cent. on the preference shares.

Stewarts and Lloyds.—After setting aside £100,000 for depreciation, the net profit for the year ended December 31, 1913, amounts to £246,064, an increase as compared with the previous year of £39,168. Adding the balance brought forward, there is available the sum of £336,495. The directors propose to place £50,000 to reserve and £20,000 to an employees' benefit fund, and recommend a dividend for the year of 2s. per share on the deferred shares, together with a bonus of 6d. per share, leaving £95,370 to carry forward. For 1912 the dividend was 1s. 6d. per share.

British Aluminium Company.—Including £10,207 brought forward, the profit for the year ended December 31, 1913, amounted to £278,927. This sum has been dealt with as follows:—Provision for income-tax, legal expenses, bad and doubtful debts, depreciation, and proportion of profits payable to directors, £23,007; prior lien debenture service fund, £48,000; debenture stock service fund, £43,224; reserve for depreciation, £50,000; carried to reserve account, £50,000. The directors also recommend a dividend of 5 per cent. per annum, less tax, on the ordinary shares, leaving £16,690 to be carried forward. The reserve account now amounts to £130,000, and the depreciation reserve account to £150,000.

London United Tramways Company.—Mr. W. M. Ackworth presided at the annual meeting on March 25. He said that more than 97 per cent. of the shares had been exchanged for the shares of the London and Suburban Traction Company. There had been an increase in the traffic receipts of £5,562, but owing to the increased cost of coal and other material, the expenses had increased by £12,000, so that the net profits showed a decrease of £5,635, compared with 1912. They might look for a reduction of expenses during the current year, as the coal contract had been placed at a good price, and there had been a fall in the cost of materials generally. Last year they carried 60,000,000 passengers, which showed there was still some room for tramways.

Metropolitan Electric Tramways and Competition.—In proposing the adoption of the report at the annual meeting of the Metropolitan Electric Tramways Company on March 25, Mr. E. Garcke observed that the fall in the dividend on the ordinary shares from 5½ to 3 per cent. was not due to the amalgamation. The underlying cause of the fall was the motor omnibus competition, but a large part of the damage done to tramway revenue had been made good to the shareholders, who had converted their shares, because they were participating in the profits of the omnibus service and power supply of the London Suburban Traction Company. M.E.T. preference shareholders who had converted their shares received £5 6s. per cent., instead of 5 per cent., and the ordinary shareholders 5 per cent., as compared with 5½ per cent., while those who had not converted only received 3 per cent. They hoped to better themselves in the future; for the divergent interests were being adjusted, and wasteful competition would be still further reduced. While the receipts from tramways had improved by over £15,000, the running expenses had increased by £16,000 or £17,000. The revenue from dividends had increased to £48,600 from £35,800.

London and Suburban Traction Company.—Mr. C. H. Stuart Wortley, M.P., who presided on March 25 at the annual meeting, said that the company's function was to promote co-operation and thus prevent waste, but it was none the less their business to satisfy the public. They believed that in the districts served by their subsidiary undertakings, and in respect of the services and supplies that they there provided, the public had been conscious of little or no change following upon the creation of this new partnership, except such changes as had consisted of continued improvements in both quality and quantity. Through their holding in the M.E.T. they were indirectly owners also of controlling interests in the North Metropolitan Electric Power Supply Company and its subsidiary, the North Metropolitan Electrical Power Distribution Company. The total traffic receipts of all the traction and omnibus undertakings were £1,152,619. A total of 219,000,000 passengers were carried in 1913 and 37,000,000 units of electricity were sold. They had an income of £98,025 from their holdings in the subsidiary companies and £6,309 from interest on money lent to some of the companies. The total revenue for 1913 was £105,370.

Electrification Contracts of the British Insulated and Helsby Cables Company.—At the annual meeting of the British Insulated and Helsby Cables Company at Liverpool on March 23, the chairman (Dr. E. K. Muspratt) said the year's profits were £247,351, an increase of £28,956. This was not due to extraordinary volume of business in any one department, but to a general increase. Competition was on the increase, but the directors were quite confident of being able to meet it. The general trade prospects of the country did not appear so good, but their works remained fully occupied, and some of their contracts were of exceptional magnitude. They had a contract with the London and North Western Railway Company for the supply of the whole of the high tension cable for the electrification of their suburban system. This was perhaps the most important electrical contract yet undertaken in this country. The company had also obtained an order for the overhead equipment for the electrification of the whole of the Melbourne Suburban Railways, this being one of the largest contracts of the kind ever placed. By writing £35,000 off patents and goodwill, which originally stood at £251,672, they had extinguished that item. A final dividend of 9s. per share was declared on the ordinary shares, making 13 per cent. for the year.

WEEKLY TRAFFIC RETURNS.

Official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended March 21 gave total receipts of £222,221, or £5,495 more than in the corresponding week last year. The total length of track was 2,863 miles, or 24 more than for the corresponding week. Receipts were at the rate of £77 12s. 4d. per track mile, an increase of £1 5s. 7d. as compared with last year.

COPPER AND ALUMINIUM MARKET.

March 27, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton:—

	Friday, March 27.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	64 17 6	64 2 6	66 2 6
,, ,, (three months)	65 5 0	64 11 3	66 5 0
Electrolytic Copper—bars or ingots ..	67 10 0	66 15 0	69 0 0
Aluminium—bars or ingots	83 0 0	83 0 0	89 0 0

COAL MARKET.

March 27, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows:—

	Friday, March 27.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	
Best Admiralty Welsh (large)	22 6	22 9	25 0	Owing to the miners' strike there were no quotations.
Best Seconds	21 9	22 3	24 3	
Ordinary Drys	19 6	20 0	23 0	
Best Washed Nuts	20 0	21 0	22 0	
Best Washed Peas	19 0	19 6	20 6	
Cardiff, f.o.b.—				
Best Admiralty (large) ..	18 0	18 3	20 0	
Best Seconds	17 3	17 9	19 3	
Ordinary Drys	15 0	15 6	18 0	
Best Washed Nuts	15 6	10 6	17 0	
Best Washed Peas	14 6	15 0	15 6	
Newcastle, f.o.b.—				
Best Steams	13 9	14 0	16 0	
Best Seconds	11 6	11 6	14 0	
Smalls	8 0	7 9	10 9	

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregate. Wks.	Aggregate. 1913-4.	Increase or Dec.
Anglo-Argentine	Mar. 18	£56,305	£55,913	11	£628,953	+ £20,016
Auckland..... (28 days)	Feb. 13	20,117	23,552	34	159,090	— 439
Ballarat and Bendigo	Jan.	5,169	5,075	42	39,650	— 818
Brazilian St. Rly. Mlrs	Feb.	46,044	49,305	30	368,458	+ 57,293
Brazilian Traction.....	Mar. 15	92,608	96,023	11	1,045,283	+ 68,897
Brisbane	Feb.	22,860	25,260	8	51,590	+ 5,920
British Columbia ... $	Feb.	688,333	704,008	35	6,034,831	+ 352 403
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacroze .	Feb.	40,824	40,377	34	356,923	+ 8,140
Calcutta.....Rs.	Mar. 21	62,068	65,616	11	8,19,914	+ 38,726
Cape Town	Feb	...	13,342	...	...	...
Carthagena & Herreria	Feb.	3,053	2,919	8	5,695	— 632
Cordoba.....	Jan.	11,809	12,735	43	133,055	+ 11,904
East India	Feb.	1,622	1,701	30	13,518	+ 516
Kalgoorlie.....	Feb.	2,644	2,169	8	4,509	— 779
La Plata.....	Feb.	4,942	4,786	8	10,062	— 455
Lima.....	Sept.	25,660	34,110	39	300,647	+ 23,783
Lisbon ..... Mlrs.	Jan.	....	156,175	4	126 175	...
Madras (14 days) Rs.	Mar. 15	26,827	29,347	10	139,279	+ 11,866
Melbourne	Dec.	...	69,000	...	...	...
Mexico ..... $	Feb.	329,361	553,804	9	1,133,165	+ 242,169
Montevideo.....	Feb.	34,368	35,8 5	17	137,901	+ 1,965
Para	Mar. 22	4,333	3,5 6	16	55,048	— 11,464
Port Elizabeth.....	Feb.	...	3,510	...	...	...
Shanghai ..... $	Mar. 18	19,185	24,000	11	261,400	+ 43,854
Singapore ..... $	Mar. 21	11,506	11,838	11	145,679	+ 8,899
Toronto ..... $	Feb.	718,313	777,648	9	1,625,628	+ 130,387
Winnipeg..... ..... $	Feb.	320,431	350,977	9	743 648	+ 61,720

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1913-4.	Increase or Dec.
Aberdeen Corporation..	Mar. 18	£1,372	£1,459	+ £87	42	£67,086	+ £3,841
Accrington Corp.	,, 18	539	553	+ 14	50	28,708	+ 2,439
Ayr Corporation	,, 21	212	240	+ 28	44	16,027	+ 2,319
Bath Electric	,, 18	695	709	+ 14	11	7,766	+ 129
Birkenhead Corp.	,, 22	1,119	1,205	+ 86	51	65,619	+ 5,889
Birmingham Corp.	,, 21	11,040	12,485	+ 1,445	51	609,324	+ 51,632
Blackburn Corporation	,, 18	1,018	1,165	+ 127	51	65,597	+ 5,302
Blackpool Corporation	,, 19	573	552	— 21	49	83,178	+ 12,799
Bolton Corporation	,, 22	3,071	2,565	— 506	51	138,837	+ 7,000
Bournemouth Corp.	,, 25	2,627	1,602	— 1,025	51	102,890	+ 8,731
Bradford Corporation..	,, 21	5,684	5,614	— 70	51	300,259	+ 18,879
Brighton Corporation ..	,, 22	964	813	— 151	51	53,523	+ 2,970
Bristol	,, 20	6,732	7,250	+ 518	11½	82,930	+ 5,890
British Elec. Federatn.	,, 20	40,820	50,181	✻	...	...	...
Burnley Corporation	,, 21	1,816	1,591	— 225	51	84,130	+ 8,339
Burton-on-Trent Corp.	,, 22	275	273	— 2	51	14,962	+ 782
Bury Corporation	,, 22	1,500	1,294	— 206	51	68,275	+ 2,319
Cardiff Corporation	,, 14	2,536	2,574	+ 38	50	135,223	+ 12,249
Chatham and District..	,, 19	816	810	— 6	11	8,930	— 260
Chesterfield Corp.	,, 19	213	230	+ 17	50	13,094	+ 1,387
Colne & Trawden	,, 21	323	240	— 83	11	2,846	+ 27
Cork Electric	,, 19	483	471	— 12	11	4,941	+ 23
Croydon Corporation	,, 13	1,438	1,504	+ 66	49	80,858	— 5,829
Darlington Corporation	,, 21	236	247	+ 11	51	12,687	+ 1,145
Derby Corporation	,, 21	964	905	— 59	51	49,731	+ 4,270
Dover Corporation	,, 21	225	190	— 35	51	12,120	+ 69
Dublin & Lucan	,, 20	141	128	— 13	11	1,277	— 36
Dublin United	,, 20	5,316	5,605	+ 289	12	59,034	— 2,330
Dundee City	,, 18	1,128	1,216	+ 88	44	57,265	+ 3,838
East Ham Corporation	,, 21	1,120	1,010	+ 110	51	52,612	— 2,577
Exeter Corporation	,, 20	272	286	+ 14	51	17,025	+ 787
Gearless Motor Buses.	,, 21	...	449	...	12	5 148	...
Glasgow Corporation	,, 21	19 541	20,979	+ 1,438	43	858 214	+ 59,924
Glossop(U.Elec.Supply)	,, 21	134	116	— 18	12	1 433	— 23
Halifax Corporation	,, 17	1,746	1,903	+ 162	50	104,695	+ 4,097
Hastings & District	,, 18	737	718	— 19	11	7,740	— 63
Huddersfield Corp.	,, 21	1,949	2,187	+ 238	51	104,421	+ 5,769
Hull Corporation	,, 21	3,126	3,216	+ 90	51	161,534	+ 8,222
Ilford U.D.C.	,, 21	451	451	Nil	50	22,847	— 804
Ilkeston Corporation	,, 25	139	123	— 16	52	6,836	+ 8-9
Ipswich Corporation	,, 21	424	372	— 52	51	22,666	+ 731
Isle of Thanet	,, 21	464	309	— 155	25	8,282	+ 456
Kilmarnock Corp.	,, 21	157	164	+ 7	44	7,717	+ 491
Lanarkshire	,, 19	1 544	1,779	+ 235	11	20,231	+ 2,636
Lancashire United	,, 18	1,312	1,525	+ 213	11	16 867	+ 2,242
Leeds City	,, 21	7,707	7,897	+ 190	51	412,085	+ 17,152
Leicester Corporation..	,, 21	2,769	2,798	+ 29	12	31,850	+ 1,791
Leith Corporation	,, 21	632	679	+ 47	44	31,150	+ 1,482
Leyton U.D.C.	,, 5	1,159	1,268	+ 109	48½	64,433	+ 824
Liverpool Corporation..	,, 21	11,793	12,645	+ 847	11	145,070	+ 7,853
Llandudno & Colwyn B.	,, 20	215	164	— 51	16	2 428	— 52
London County Council	,, 18	40,270	42,554	+ 2 284	49	2,123,117	+ 18.810
London Gnl. Omnibus..	,, 21	52,186	53,649	— 1,463	12	651.024	+ 2 463
London United	,, 20	5,542	5,386	— 156	12	60,894	+ 827
Lowestoft Corporation	,, 21	152	149	— 3	24	4,353	+ 390
Maidstone Corporation	,, 19	159	153	Nil	51	9,938	+ 647
Manchester Corp.	,, 21	16,816	17,243	+ 427	51	891,383	+ 37,738
Met. Elec. Trys.	,, 20	8,839	8,527	— 312	12	95,039	+ 12
Nelson Corporation	,, 21	228	187	— 41	51	10,541	+ 547
N'castle-on-Tyne Corp.	,, 21	4,664	4,937	+ 273	50	251,062	+ 22,203
Newport (Mon) Corp.	,, 21	736	738	+ 2	51	39,033	+ 2.545
New St Helens & Dist	,, 18	685	764	+ 79	33	33,584	+ 2.746
Northampton Corp	,, 20	510	544	+ 34	51	28,931	+ 1,709
Nottingham Corp.	,, 19	3,236	3,322	+ 53	50½	168,513	+ 7,215
Oldham Corporation	,, 22	2,122	2,118	— 4	52	114,176	+ 7,711
Portsmouth Corp.	,, 21	1,768	1,774	+ 6	51	112,497	+ 7,504
Preston Corporation	,, 18	796	864	+ 68	51	44 739	+ 2,763
Provincial	,, 21	1,744	1,583	— 133	24	41,720	+ 1,109
Reading Corporation	,, 19	634	646	+ 12	50	34,980	+ 2,504
Rochdale Corporation	,, 21	1,805	1,450	— 355	51	80,611	+ 2.844
Rotherham Corp.	,, 25	1,219	857	— 362	51	51,409	+ 9,488
Salford Corporation	,, 25	5,445	5,051	— 394	51	255,871	+ 12 335
Sheffield Corporation	,, 22	7,106	7,421	+ 315	52	382,764	+ 27.445
Southampton Corp.	,, 18	1,144	1,182	+ 38	50	65,510	+ 3.501
Southend-on-Sea Corp	,, 18	569	698	+ 129	51	46,043	+ 7,975
South Met. Trys.	,, 20	754	960	+ 206	12	11,053	+ 3,031
South Shields Corp.	,, 21	713	715	+ 2	51	36,561	+ 4.107
Sunderland Corp.	,, 24	1,405	1,277	— 128	51	73,077	+ 6 207
Sunderland District	,, 18	516	553	+ 40	20	11.318	+ 1,196
Swindon Corporation	,, 18	146	153	+ 7	50	8,293	+ 470
Trys. (M.E.T.) 'Buses	,, 21	1.635	7,953	+ 6,328	12	92.883	..
TynesideTrys.&Tmrds	,, 18	454	508	+ 54	11	5,215	+ 202
Wallasey Corporation	,, 21	998	1,105	+ 107	51	61.120	+ 5,517
Walsall Corporation	,, 21	607	623	+ 16	12	7 049	+ 181
Walthamstow U.D.C	,, 21	707	696	— 11	51	37,605	+ 1,577
Warrington Corp	,, 19	470	442	— 28	51	22,499	+ 387
West Ham Corporation	,, 19	2,726	2 697	— 29	50	137,134	+ 4,357
Wigan Corporation	,, 19	1,474	1,475	+ 1	50½	75,325	+ 6,598
Wolverhampton Corp	,, 25	1,252	1,010	— 242	52	55,582	+ 2,458
Yorkshire (W. Riding)	,, 22	1,403	1,334	— 22	12	17.031	+ 1.326

✻ From such of the services as were working both last year and this year the receipts show an increase of £175 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London	Mar. 21	£4,680	£5,404	+ £724	12	£62,549	— £2,124
City and South London	,, 21	2,838	2,895	+ 57	12	34,313	— 1,925
Liverpool Overhead	,, 22	1,481	1,599	+ 118	12	19,579	+ 604
London Electric	,, 21	13,030	14,690	+ 1,610	12	175.945	+ 1,755
Mersey	,, 21	2.140	2,108	— 32	12	27.048	+ 43
Metropolitan	,, 22	15,765	17.593	+ 1 828	12	214,062	+ 18,981
Metropolitan District	,, 21	12,582	13.339	+ 757	12	158 633	+ 530

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TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, March 27.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	70½ — 72½
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	...	4⅞ — 5⅛
5	Do. 5½% Cum. 2nd Pref.	...	4⅛ — 4⅜
100	Do. 4% Deb. Stk. Red.	...	92½ — 94½
100	Do. 4½% Deb. Stk. Red.	...	97 —100
100	Do. 5% Deb. Stk. Red.	...	96½ — 98½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 —106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅜ — ⅝
1	Do. 5% Cum. Pref	...	½ — ¾
100	Do. 4½% 1st. Mort. Deb. Stock, Red.	— 2	68 — 73 xd
100	Birmingham Dis. Pwr. & Trac, Co. Ld. 4½% 1st Db. Sk.	...	86 — 88
10	Blackpool and Fleetwood Tramroad Co.	...	14 — 15
	Bombay Elec. Supply and Trams. Co., Ord.	...	13½ — 14½
10	Do. do. 6% Cum. Pref	...	10¾ — 11¼
100	Do. do. 4½% Db. Stk Rd.	...	94½ — 96½
$100	Brazilian Traction Light and Power Co. Lim.	+ 4½	83½ — 85½
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	...	7⅛ — 8⅛
5	Do. do. 5% Cum. Pref	...	4⅞ — 5⅜
100	Do. do. 4½% 1st Deb Stock, Red.	...	98 —101
10	Bristol Tramways and Carriage Co.	— ⅛	6¾ — 7
10	Do. do. 4% Cum. Pref.	— ⅛	6⅞ — 7⅛
100	Do. do. 4% Deb. Stock	...	100 —102
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	+ 1	115 —119
100	Do. Pref. Ord. Stock	...	104 —108
100	Do. 5% Cum. Perpetual Pref. Stock	...	101 —104
100	Do. 4½% 1st Mort. Debs.	...	98 —101
40	Do. 4½% Vancouver Power Debs.	...	94 — 98
100	Do. 4½% Perpetual Cons. Deb Stk.	+ 1	94½ — 96½
100	British Elec. Traction Co., Lim., 6% Cum. Pref.	...	89 — 92
100	Do. 7% Non-Cum. Pref.	...	56 — 59
10	Do. 6% Pref. Ord. Non-Cum.	...	15½ — 17½
100	Do. Deferred Ord. Stock	...	6¼ — 8½
100	Do. 5% Perpetual Debenture Stock	— 2½	93½ — 96½ xd
100	Do. 4½% Second Debenture Stock, Red	— 1	79 — 82
100	B. Aires Port & City Trms 6% 1st Deb. Stk. Red.	...	73 — 78
100	Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb.	...	100 —102
5	Calcutta Tramways Co., Limited Ord	...	6¼ — 6¾
5	Do do. 5% Cum. Pref.	...	5 — 5¾
100	Do. do. 4½% 1st Deb. Stock, Red.	...	96 — 99
1	Cape Electric Tramways, Ld.,	...	⅝ — ¾
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	3 — 3¼
	Do. 5% Debs. Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co (1904), Lim.	...	5½ — 5½
100	Do. 4% Debenture Stock Red, 1985	...	91 — 96
100	Colombo Elec. Trys. and Ltg Co. 5% 1st Mort. Deb	...	89 — 93
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	+ 2	92 — 95
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	— 6⅞
10	Dublin United Trams. Co. (1896) Lim. Ord.	...	— 11 11/16
10	Do. do. 6% Pref.	...	— 12⅝
100	Do. do. "A" Red.	...	— 81
100	Do. do. Deb. Stock "B" Red.	...	— 79
10	Gateshead & Dist Trys. Co., Ord.	+ ¼	9 — 9½
10/-	Hastings & Dist. Electric Trams. Co., Ld., Ord.	...	⅝ — ¾
1	Do. do. 6% Cum Pref.	...	½ — ¾
100	Do do 4½% Deb. Stk. Red.	— 2	65 — 70 xd
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	93½ — 97½
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)	...	86 — 90
10	Imperial Tramways, Ord.	...	3 — 3½
10	Do do. 6% Cum. Pref.	...	6½ — 6¾
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.	...	2 — 2½
100	Do. 4% Debenture Stock	...	71 — 76
1	Kalgoorlie Elec. Trams., Ltd.	...	0 — 1/16
100	Do do. 5% "A" Deb. Stk.	...	85 — 90
	Do do. 6% "B" do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.	...	⅞ — 1
10	Lanarkshire Tramways Co.	...	9¾ — 10¼
100	Lancashire United Tramways, 5% Prior Lien Deb.	...	87 — 89
1	Lisbon Electric Trams., Lim., Ord.	...	1⅛ — 1⅜
1	Do. 6% Cum Pref.	...	1⅛ — 1 1/16
100	Do. 5% Mort. Debs.	...	91 — 96
1	London and Suburban Trac. Co., Lim., Ord.	...	7/32 — 9/32
100	London General Omnibus Company, Limited 4½% Deb.	...	97½ — 99½
100	Do. Do 5% Cum, Inc. Deb. Stk. Red.	...	89 — 92
100	London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red	— 1½	60 — 64
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref.	— ½	4⅞ — 5¼ xd
5	Do. do. 5% Deb. Stk., Red.	...	101 —103
10	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	79 — 82
$100	Manila Electric R.R. and Lighting Corp. Capital Stk	— 2	107 —110
$1,000	Do. do. 5% Bds.	...	98½ —100¼
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	1⅛ — 1 3/16
100	Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red.	...	89 — 92
100	Do. 5% Deb. Stock, Red.	— 2½	85½ — 88½ xd
100	Mexico Tramways Co., Common Stock	+ 6	7¼ — 77
500	Do Gen. Con. 1st Mort. Gld Bonds	+ 3	80 — 84
100	Do. 6% 50-yr. Mort. Bonds	+ 2½	78 — 83
...	Michigan United Railways 5% 1st Mort. Gld Bonds	...	91½ — 93½
100	Montreal Street Railway, Sterling 4½% Debs. (1922)	...	98 —100
100	Do. 4½% Sterling Debs, (1922)	...	99 —101
1	National Steam Car Co. Ltd	...	11/16 — 13/16
10	Oldham—Ashton and Hyde Elec. Ord.	...	6 — 6½
10	Do do. 5% Cum Pref.	...	5¾ — 6
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	4⅜ — 4⅞
5	Do. do. 6% Cum. Pref.	— ⅛	4 — 4½
1	Perth (W A.) Elec Trams., Ld., Ord.	...	—
1	Potteries Electric Traction Co., Ltd., Ord.	...	3/16 — 5/32
	Do. 5% Cum Pref	...	17/32 — 19/32
100	Do. 4½% Debenture Stock, Red.	...	84 — 87
1	Provincial Tramways, Lim., Ord.	...	13/16 — 15/16
10	Do. 5% 1st Deb. Stock	...	95 — 98
...	Puebla Tramway, Light & Power Co., Prior Lien 5%	+ 1	77 — 82
5	Rangoon Elec. Trams. & Supply Co. 6% Cum. Pref.	...	5 — 5⅛
100	Do. do 4½% 1st Mt. Db. Stk	...	95 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	89 — 91
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt 30 yr, 5% Gd. Bds.	+ 3½	97 — 99
100	Do. do. 5% 5-yr. Mort. Gold Bonds	+ 5	91 — 93
10/	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	+ 1	97 —100
$50/	Do. 5% 1st Mort. Debs., Red, 1929	+ 1	97 —100
10	Shanghai Elec. Construction Co.	...	12¾ — 13¾
10/	Singapore Elec. Tramways Lim., 5% Debs. Red	...	88 — 92
	South Met. Elec. Trams. and Ltg. Co., 6% Cum Pref.	...	⅝ — ¾
100	Do. do. 4% Deb. Stk.	...	66 — 70
	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	95 — 97
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	98 —100
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	83 — 85
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	— 1	92 — 94
5	United Elec. Tramways of Monte Video, Ord.	...	4⅝ — 5⅛
5	Do. do. 6% Cum. Pref.	...	4⅜ — 5¼
100	Do. do. 5% 1st Deb. Stk. Red.	— 1	94 — 97
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	+ ½	93½ — 95½
5	Yorkshire (West Riding) Elec Trys. Co Ord.	...	7/16 — 9/16
5	Do. do. 6% Cum Pref	...	4 — 4½
100	Do. do. 4½% 1st Deb. Stock. Red.	...	83 — 86

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THE

Tramway & Railway World

Vol. XXXV. No. 17. | LONDON, SATURDAY, APRIL 4, 1914. | [Established in 1892.

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Thursday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone; No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

CITY OF BIRMINGHAM.

TRAMWAYS DEPARTMENT.

STEEL TRAMWAY RAILS AND FASTENINGS.

The Tramways Committee invite tenders for the manufacture, supply, and delivery of 2,700 tons of Grooved Steel Girder Rails and 4,000 pairs of Fishplates.

Specifications, general conditions, form of tender, and drawings may be obtained from the undersigned on payment of a deposit of two guineas, which will be returned if a *bonâ-fide* tender is sent in, as soon as the Tramways Committee have adjudicated upon the various tenders.

Extra copies of the specification and drawings can be had on payment of a further fee of half-a-guinea per set, which will not be returned.

Persons tendering must at the time of tendering and at all times during the execution of the works be paying all their workpeople not less than the standard rate of wages in the districts where such workpeople are actually engaged in the execution of the work, and must be observing the hours and conditions of labour recognised by the Associations of Employers and the local organised bodies of workers in the various trades in such districts. The contractor will be held responsible for the observance of these conditions by any sub-contractor employed by him.

Sealed tenders, addressed to "The Chairman of the Tramways Committee," and endorsed "Tender for Rails," must be delivered to the Tramway Offices, the Council House, Congreve Street, Birmingham, by 12 o'clock noon on Thursday, April 16, 1914.

The Tramways Committee do not bind themselves to accept the lowest or any tender.

ALFRED BAKER,
General Manager.

Tramways Offices, the Council House,
Congreve Street, Birmingham.

DONCASTER CORPORATION.

TRAMWAYS DEPARTMENT.

The Electricity and Tramways Committee are prepared to receive tenders for the supply of :—

1,200 tons Steel Rails (112lbs. per yard), Centre Groove type.
36 tons Steel Fishplates.
20 tons Steel Soleplates.

The Corporation are not bound to accept the lowest or any tender, and contractors tendering do so at their own cost and charges.

A charge of 10s., which will not be returned, will be made for each copy of the form of tender, specification, etc.

Form of tender, specification, and copy of detail drawing may be obtained on payment at the Offices of the Borough Engineer, 3, Priory Place, Doncaster.

Tenders, endorsed "Tender for Rails, etc.," are to be addressed to the Chairman of the Electricity and Tramways Committee, and delivered at the Office of the undersigned, before noon of Friday, April 17, 1914.

R. A. H. TOVEY,
Town Clerk.

1, Priory Place, Doncaster,
March 30, 1914

CITY OF LEEDS.

ELECTRIC LIGHTING DEPARTMENT.

TURBINE ALTERNATOR, CONDENSING PLANT, ETC.

The Leeds City Council are prepared to receive tenders for a Steam Turbine Three-phase Alternator and Exciter, of 12,000 kw. capacity or thereabouts, running at a speed of 1,000 or 1,500 revolutions per minute, and Steam Turbine-driven Surface Condensing Plant.

Copies of the general conditions, specification and form of tender, may be obtained from Mr. C. Nelson Hefford, Manager of the Department, 1, Whitehall Road, Leeds, on payment of a deposit of five pounds, which will be refunded on receipt of a *bonâ-fide* tender.

The Corporation will be prepared to consider separate tenders for the different sections of the plant in accordance with the conditions attached to the specification.

Tenders must be in the form attached to the specification, and must be delivered to me at the Town Hall, Leeds, not later than 11 o'clock in the forenoon on Monday, May 11, 1914, in sealed envelopes, endorsed "Electric Lighting—Tender for Generating Plant."

The Corporation do not bind themselves to accept the lowest or any of the tenders sent in.

ROBERT E. FOX,
Town Clerk.

Leeds, April 3, 1914.

BOROUGH OF TORQUAY.

ELECTRICITY DEPARTMENT.

The Electricity Committee of the Torquay Corporation invites tenders for the following :—

Contract "S 6."

Section 1.—Two Water-Tube Boilers.
Section 2.—Fuel Economiser.
Section 3.—Steam Pipes and Valves.
Section 4.—Cast-Iron Feed Pipes and Valves.
Section 5.—Cast-Iron Feed Tank.
Section 6.—Induced-Draught Fan and Motor.

Specifications and drawings may be obtained on application to the Borough Electrical Engineer, Mr. Chas. W. Salt, Electricity Offices, Beacon Quay, such application to be accompanied by a deposit of one guinea, returnable on receipt of a *bonâ-fide* tender.

All tenders must be delivered to the undersigned not later than 12 o'clock noon on Monday, April 20.

The carrying out of the work is subject to the sanction of the Local Government Board being received to the necessary loan.

The Corporation do not bind themselves to accept the lowest or any tender.

FREDK. S. HEX,
Town Clerk.

Town Clerk's Office, Town Hall, Torquay,
March 31, 1914.

ELECTRIFICATION OF MELBOURNE SUBURBAN RAILWAYS.

The Agent-General for Victoria, Australia, is prepared to receive tenders for :—

Overhead Travelling Cranes for Sub-Stations and Lifting Tackle for Power Station

for use in connection with the Electrification of the Melbourne Suburban Railways now being carried out.

Specification and form of tender may be obtained from Messrs. Merz and McLellan, Consulting Electrical Engineers, 32, Victoria Street, Westminster, S.W., on or after Monday, April 6, 1914. Any *bonâ-fide* tenderer requiring information in addition to that contained in the specification may apply to the Consulting Engineers, Messrs. Merz and McLellan, 32, Victoria Street, Westminster, S.W.

The charge for the specification in duplicate is £5 5s. and £2 2s. each for any further copies. Sums paid for copies will be refunded on the receipt of a *bonâ-fide* tender for the whole of the work included in the specification.

Cheques (crossed) in payment for specifications must be made payable to the Agent-General for Victoria.

Sealed tenders in duplicate, marked "Electrification of

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Melbourne Suburban Railways—Tender for Overhead Travelling Cranes for Sub-Stations and Lifting Tackle for Power Station," are to be addressed to the Agent-General for Victoria, Australia, and delivered at his office, Melbourne Place, Strand, W.C., not later than noon on Monday, April 27, 1914.

The Government do not bind themselves to accept the lowest or any tender, and ample security will be required from the contractor whose tender is accepted.

(Signed) Peter McBride,
Agent-General for Victoria, Australia.

COUNTY BOROUGH OF WIGAN.

WIGAN CORPORATION TRAMWAYS DEPARTMENT.

The Tramways Committee of the Wigan Corporation are prepared to receive tenders for the supply of :—

Tramcar Accessories, Steel Tyres and Axles.
Brass and Iron Castings (including Brake Blocks)
Ironmongery.
Iron and Steel.
Overhead Line Material.
Paint and Varnish.
Oil and Grease.
Timber.
Glass.

Specification and forms of tender may be obtained on application to Mr. James Slevin, Electrical and Tramways Engineer, Bradford Place, Wigan.

Tenders (endorsed with the name of the article tendered for) to be addressed to the Town Clerk, King Street West, Wigan, and must be received not later than Saturday, April 18.

The Corporation do not bind themselves to accept the lowest or any tender.

William Henry Tyrer,
Town Clerk.

Town Clerk's Office, Wigan,
March 31, 1914.

(Continued on page 265.)

NOW READY. ONE SHILLING. APRIL ISSUE OF
Financial Review of Reviews

SPECIAL ARTICLES :

The Mexican Crisis. By Dr. R. de Zayas Enriquez.
(By command of General Huerta, President of Mexico.)
The Fight for London Traffic. By Arnold Wright.
The Railway Labour Problem. By T. Good.
The Panama Canal as a Commercial Proposition. By Henry A. Watt, M.P., and T. Hynes, LL.B.
Statistical Record of 5,000 Stock Exchange Securities.

PUBLISHER: 2, WATERLOO PLACE, PALL MALL, S.W.

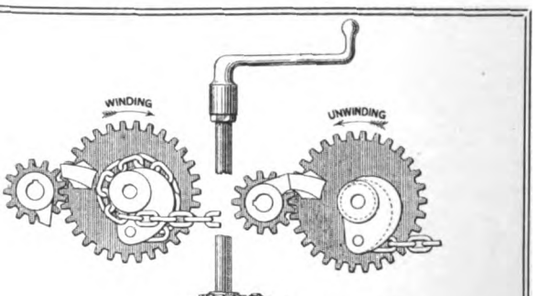
Pole Paints
As supplied to important Companies at home & abroad. Durable, ready-mixed, permanent colours that defy rust and exposure. Samples & Prices on request.
Robert KEARSLEY & Co., Ltd.
RIPON, England

SIMPLEX CONDUITS, Ltd.
GARRISON LANE, BIRMINGHAM.
Makers of Simplex Steel Conduit System and
WIRES and CABLES.
BITUMEN CABLES.
TRAMCAR HEATERS.
TRAMCAR METERS.
MEASURING INSTRUMENTS.
WATERTIGHT FITTINGS FOR CAR SHEDS.
ENCLOSED (Indicating) FUSES (to N.E. Code or English Standard).
500 page Catalogue sent free on request.

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers,
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." Telephone: 3488 Leeds.
OVERHEAD LINE MATERIAL AND SUPPLIES.

MILLARS' TIMBER AND TRADING CO., LTD.
PINNERS' HALL, GREAT WINCHESTER STREET, LONDON, E.C.
SUPPLY
JARRAH
THE SANITARY WOOD PAVING
REGISTERED TRADE MARK M.J.
Telegrams: "Jarrah, London." Telephone: 368. London Wall.

SPECIAL Car Varnish
for finishes of great durability and brilliant lasting lustre.
Sole Manufacturers:
PINCHIN, JOHNSON & Co., LTD.,
Minerva House, Bevis Marks,
LONDON,
E.C.



The "Peacock" IMPROVED Brake
(PATENT).
Note the simplicity of the Radial Contact pieces which render this the quickest of all geared hand brakes by
(1) Preventing the drum from over-running on release ;
(2) Stopping the drum always at the point from which recovery of chain is most rapid ;
(3) Eliminating all idle turning of the handle.
THE "PEACOCK" BRAKE CO., 27, CLEMENTS LANE, LONDON, E.C.

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THE
Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
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One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, APRIL 4, 1914.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS.
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

THE WELDING OF JOINTS.

Experience continues to accumulate of the favourable results obtained from the abolition of the fishplate joint in tramway tracks and the substitution of the process of welding the ends of the rails together. Gallons of ink, seas of talk, and floods of tears have, figuratively speaking, been expended over the woes of maintaining rail joints. The wonder in past years has been why there should not have been less lamentation, and why more active steps were not taken to remove the trouble. Theoretically, at all events, the advantages of the welded joint have been known for years, but for a time only the favoured few among tramway managers and engineers adopted it. They were favoured in possessing the enterprise, and they must have considered themselves happy in the results. Perhaps there lurked at the back of the minds of many tramway officers the suspicion that the welded track would go awry in hot weather through rail expansion, and that the welds might pull apart in cold weather through rail contraction. The suspicion proved groundless; substantial paving prevents the former trouble, and good welds prohibit the latter. One reason, of course, for delay in adopting the welded joint was that in some cases it was found, before later improvements, that for repairing badly worn joints it was not always successful. No difficulty arises in the case of new track, or track which is being reconstructed, because it can be allowed to stand after completion as long as may be necessary. The significant announcement was made in our pages the other day that not only is joint welding by the thermit process now being carried out in a large number of towns, but that the number of joints so welded during 1913 in the United Kingdom was nearly 17,000, and the number throughout the world was over 108,000. All the welding in this country was on new or reconstruction work. It has also been found that on old and badly-worn track, the life may be lengthened by the process of cast-welding the joints, as the weakened rail-joint and foundations can be strengthened by being bedded with a large quantity of cast-iron poured in hot. It is, however, the benefits of the thermit weld which have been most widely experienced in this country. The life of the track is very much prolonged, as the joint lasts as long as the rest of the rail. The electric conductivity of the joint is at least as good as that of the rest of the rail, so that bonds are merely an additional safeguard, and at the present time these are seldom used in welded track. The rail-joints and the cars are relieved from the destructive effects of the hammer blows so much in evidence with fish-plate joints which are not in pristine condition. While these advantages accrue to the owners of the tramways, the public who use the cars have also reason to bless the welded joint. Most of them no doubt know not why it is that some tramways afford much smoother riding than others. All new and properly constructed tramways, of course, afford smooth riding, but it is only on those where the joints are welded that the smooth running without jar when passing over the rail-ends is a permanent feature.

EX-SERVICE MEN AS TRAMWAYMEN.

While not claiming that many motormen and conductors who have never had the advantage of serving in his Majesty's sea and land forces are not every whit as attentive to duty and as tidy in appearance as ex-service men who work alongside of them, we do contend that, taking the two classes man for man, the latter offer certain advantages to tramway undertakers. A decade and a half ago the manager who took on ex-sailors and soldiers had to run the risk of finding some of them addicted to too frequent quenchings of thirst, notwithstanding that their discharge papers disclosed no flaw in their characters. That risk, however, is now a thing of the past. The habits of the classes from whom recruits are drawn have very markedly changed as regards the use of intoxicants. One may go into a ship or regiment and find that between 70 and 80 per cent. of the men are abstainers. It is true that some are given to consuming a greater quantity of cigarettes than is good for them, but that is a failing to which the civilian employee is also subject. In the case of the service men, they have for some years had the benefit of being instructed upon the evil effects to nerves and sight of excessive smoking, and steps are also taken to train them in abstinence. Protection against engaging undesirables from those points of view is afforded by the medical inspection which now prevails on all large tramway undertakings. The advantages to be derived from employing a Jack Tar or a Thomas Atkins are sufficient to lead mangers to give the preference to desirable applicants from their ranks. They have been trained to endure discipline, obedience to orders being enforced as the greatest of all their duties. Long practice has rendered personal tidiness and brightness of buttons almost a second nature. Educational attainments are also encouraged in the service from which the man comes; indeed, promotion at every stage depends upon his success in assimilating the instruction imparted by the regimental schoolmaster. He is also trained to quick judgment, a quality likely to render a man resourceful in case of accident, enabling him, for instance, to prevent persons jumping from a runaway car. Doubtless some of these

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and other considerations that might be urged influenced Mr. Alfred Baker, the general manager of the Birmingham Corporation tramways, in giving evidence on Thursday last in favour of the employment of ex-service men. Mr. Baker appeared before the Committee which is now sitting in London with a view to securing a wider range of employment for retired soldiers. The need for this has been rendered greater during the past few years on account of the introduction of the questionable reform of not permitting more than 10 per cent. of the men to re-engage after the completion of twelve years with the colours. Mr. Baker was able to show that the Birmingham Tramways Committee are good friends of the capable ex-soldier, for these men number 500, or one-third of the total number of their employees. Glasgow also is distinguished for the large proportion of military men among its tramway hands, who are specially prominent in the several bands connected with the tramwaymen. If testimony were required concerning the loyalty of former soldiers in time of strikes, it could be forthcoming from the London and South Western Railway Company, who have long been distinguished for the large number of these men in their employ.

PRIVATE BILL LEGISLATION.

London United Tramways Company.—This company's Bill came before Mr. W. Guinness's Committee of the House of Commons on March 31. Powers were sought to enable the company to enter into agreements with the local authorities and with bodies owning contiguous lines with regard to running powers, through tickets, electric supply trail cars, and to enable each local authority, if they saw fit, to postpone the date at which the local authority had a right to purchase the tramways in their area for a period not exceeding forty-two years. Mr. J. Devonshire, managing director of the company, said the object of the promoters in asking for power to extend the time of purchase was to enable bargains to be made with the local authorities whereby, in consideration of the extension, the company would effect road widenings. In cross-examination on behalf of Middlesex County Council, Mr. Devonshire denied that the Bill was promoted because the company were heavily burdened financially, and it would give them a longer time to get out of their difficulties. The purchase rights of Middlesex County Council would remain just as they were now. After hearing opposition, the Committee found the preamble not proved so far as related to the provision enabling agreements to be entered into for the extension of time for purchase. On the application for power to run trail cars, Mr. A. L. C. Fell, chief officer of the London County Council tramways, stated that trail cars could be worked 43 per cent. cheaper than other cars. Mr. Fell said he was satisfied that trail cars could be easily worked on the system, and without danger. The Committee granted powers to run trail cars except where agreements to the contrary had been made with local authorities in former years.

Norwich Electric Tramways.—The company's Bill for the construction of additional tramways, etc., on March 30 complied with the further standing orders, and was sent to the Commons prior to committee stage and third reading.

NEW AND PROSPECTIVE WORK.

Belfast.—The Tramways Committee recommend the purchase of a storage battery and an extension of the buildings of the generating station.

Bournemouth.—The Board of Trade has sanctioned the borrowing of a sum of £11,558 for the relaying and doubling of tramways.

East Ham.—A sum of £2,031 is to be spent in doubling the tramway in High Street North, East Ham.

Huddersfield.—Sanction has been given by the Board of Trade to the doubling of the Fartown-Smithy tramway track. It is also proposed to lay double lines in New Hay Road. South Crosland Council are asking for an extension to Netherton.

Johannesburg.—As soon as a location is established at Newlands the Town Council have decided to provide the sum of £25,000 for a tramway extension.

Leicester.—An expenditure of £2,275 has been sanctioned on extensions at the converter house of the Leicester generating station.

London.—In addressing the Rotherhithe Traders' Association on the steps which the local members of the County Council had taken to secure tramway electrification and linking up with the Bridges, Mr. R. L. Stuart, J.P., has announced that it was almost certain that a single line with loops would be installed, the scheme to cost about £97,000.

L.C.C. TRAMWAY MATTERS.

CONTRACTS FOR MOTOR WAGONS.

At last Tuesday's meeting of the London County Council the Highways Committee, in a special report, dealt with tenders for the supply of motor wagons for the tramway department. The report stated that very large quantities of rails, ballast, stone and wood paving, cement, etc., had to be conveyed to different parts of the tramway system in connection with the renewal and repair of the permanent way. Owing to the increasing amount of work to be done it had become necessary to adopt more rapid and efficient means of transport than that provided by the horses and carts now used. The Committee were of opinion that eight motor wagons should be obtained, and tenders had been received. For the supply of six 5-ton steam motor wagons seven tenders had been obtained varying in amount from £3,420 to £4,200 with steel tyres, and from £4,140 to £4,830 with rubber tyres. Nine tenders had also been received for the supply of two 2-ton petrol motor wagons, varying in amount from £904 11s. to £1,390. It was recommended that for the steam motor wagons the tender should be accepted of Foden's, Limited, Sandbach, Cheshire, at £4,140, rubber tyres to be used, and for the petrol wagons the tender of Alldays and Onions Pneumatic Engineering Company, Birmingham, at £904 11s., should be accepted. The total sum included £70 for extra work. It was further proposed that Foden's should be allowed to sublet to Herbert Morris, Limited, the jib cranes required, and that Alldays and Onions should be allowed to sublet to the Atlas Resilient Steel Wheel Company the steel wheels required. It was estimated that at least 40 horses and carts would be displaced by the use of the motor wagons. The daily cost of a horse and cart was 8s. 11d., while for hiring horses and carts the charge varied from 9s. 6d. to 10s. a day. For some time past it had been necessary to hire 20 horses daily, at a cost of £10. By the substitution of motor traction it was estimated that a saving of £5 1s. 8d. a day would be effected, and that the total annual saving would amount to £1,525.

IMPROVEMENTS AT CLAPHAM.

The Committee had considered questions relating to the working of the tramways in the Clapham district. These were, the congestion of traffic, the headway beneath High Street, Clapham, railway bridge, which was not sufficient to allow of the passage of the Council's standard type of car when fitted with trolley equipment, and the renewal of the tramways in High Street, Clapham. An arrangement had been come to on these subjects with Wandsworth Borough Council, which it was proposed should be adopted. In regard to the congestion of traffic, it was proposed to construct a tramway lay-by in the Avenue, Clapham Common, at an estimated cost of £3,450. This included £240 for rails and fastenings, £1,000 for special trackwork, and £300 for alterations to underground pipes. It was proposed that the installation of the lay-by should be carried out by the staff of the tramway department, and that the special trackwork should be obtained from Hadfield's Steel Foundry Company. In regard to the railway bridge in Clapham High Street, the proposal was to lower the tracks and the breasts of the carriage way beneath the bridge to the extent of two inches, the estimated cost being £500. In regard to the tramways in High Street, Clapham, these required to be renewed. The tracks were at present paved with granite, but the margins and the breasts with wood. The Wandsworth Borough Council desired that the wood paving should be substituted for stone, and the agreement with the Borough Council dealt with that point.

SUPPLY OF MOTOR WAGONS.

The following tenders which were referred to the Highways Committee by the Council on February 3, 1914, were received in response to public advertisement :—

(i.) SIX 5-TON STEAM MOTOR WAGONS.

Name and address of firm.	Tyres. (a) Steel. £	(b) Rubber £
Fodens, Ltd., Sandbach, Cheshire	3,420	4,140
Mann's Patent Steam Cart and Wagon Co., Ltd., Fenchurch Avenue, E.C.	3,642	4,302
Leyland Motors, Ltd., New Kent Road, S.E.	3,636	4,500
R. Garrett and Sons, Ltd., Leiston	3,690	4,500
Yorkshire Commercial Motor Co., Hunslet, Leeds	3,841	4,572
Clayton and Shuttleworth, Ltd., Lincoln	4,110	4,830
W. Allchin, Ltd., Northampton	4,200	4,770

(ii.) TWO 2-TON PETROL MOTOR WAGONS.

Name and address of firm.	Amount of tender. £
Alldays and Onions Pneumatic Engineering Co., Ltd., Birmingham	904
J. I. Thornycroft and Co., Ltd., Westminster, S.W.	1,002
Commercial Cars, Ltd., Luton	1,050
Leyland Motors, Ltd., New Kent Road, S.E.	1,056
Do. do. (alternative for 2½ ton wagons)	1,230
Dennis Bros. (1913), Ltd., Guildford	1,090
J. and E. Hall, Ltd., St. Swithin's Lane, E.C.	1,126
Albion Motor Car Co., Upper Rathbone Place, W.	1,134
Daimler Co., Ltd., Coventry	1,183
Wolseley Tool and Motor Car Co., Ltd., Birmingham	1,390

Included in the tenders are provisional sums of £5 for each 2-ton wagon and £10 for each 5-ton wagon, which would only be expended if required. The Committee said that the works and the vehicles made by the lowest tenderers had been inspected, with the result that they recommended the acceptance of the lowest tender in each case. They proposed that the vehicles shall be fitted with resilient tyres, and the total expenditure involved would thus amount to £5,044 11s. (including £70 for extra works if required). No portion of the expenditure would be incurred during the financial year 1913-14, and provision therefore would be made in the capital estimates for 1914-5.

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It is estimated that at least 40 horses and carts will be displaced by the use of the motor wagons. The daily cost of a horse and cart has been 8s. 11d., while for hiring horses and carts the charge varies from 9s. 6d. to 10s. a day. For some time past it has been necessary to hire 20 horses daily at a cost of £10. By the substitution of motor traction it is estimated that a saving of £5 1s. 8d. a day will be effected, and that the total annual saving will amount to £1,525. The space that is at present occupied for the stabling of the horses is much needed for storage purposes. The Committee therefore recommended that eight motor wagons should be provided for use in connection with the renewal and repair of the permanent way, and that the tenders of Foden's, Limited, amounting to £4,140, for the supply of six 5-ton steam motor wagons fitted with rubber tyres, and that of Alldays and Onions Pneumatic Engineering Company, Limited, amounting to £904 11s., for the supply of two 2-ton petrol motor wagons, be accepted.

Foden's, Limited, is to be allowed to sublet to Herbert Morris, Limited (or to such other person or firm as may be approved by the chief officer under the contract), the jib cranes required in connection with the supply of the six 5-ton steam motor wagons. Alldays and Onions Pneumatic Engineering Company, Limited, are likewise to be allowed to sublet to the Atlas Resilient Steel Wheel Company (or to such other person or firm as may be approved by the chief officer under the contract), the steel wheels required in connection with the supply of the two 2-ton petrol motor wagons specified in the foregoing resolution.

All tramway reports were adopted with the exception of those relating to the supply of motor wagons for renewals and repairs, which stood over, and coach body makers, which was opposed.

THROUGH SERVICES AND OPEN CARS.

Replying to Mr. J. W. Gilbert, Mr. G. H. Hume, chairman of the Highways Committee, explained the steps that are being taken to secure through running of cars from the Embankment to Croydon, Purley, Abbey Wood, Dartford, Bexley, Erith, and Hampton Court, and said the question of running attractive services of open cars, in order to compete with motor 'bus services, was under the consideration of the Committee.

ADOPTION OF THE LEEDS SCHEME.

On March 27 the Leeds Corporation adopted the proposal made by the Special Committee of aldermen who brought about the settlement of the strike of municipal employees, under which a General Purposes Committee is to set up a labour department. Mr. J. B. Hamilton, the tramways manager, was appointed to organise the department and to act as the executive officer to the committee, in addition to his present duties. After a great deal of opposition to the scheme from Labour members, the Council adjourned the selection of the members to form the committee until April 1, when Alderman Wilson submitted the following names:—Aldermen C. H. Wilson, F. M. Lupton, R. A. Smithson, T. Oldroyd (Conservatives), Alderman F. Kinder and Councillor J. Eddison (Liberals), and Alderman W. H. McShane (Labour). An amendment submitted by the Labour party for the election of Councillor Arnott as their representative was agreed to. In introducing the Budget, Alderman Wilson stated that the cost of the strike would exceed £100,000.

MISCELLANEOUS NEWS AND NOTES.

Cement Sleepers.—Cement sleepers are being locally manufactured for use on the Giant's Causeway Electric Tramway.

Mexbrough Tramways Company's Railless Scheme.—Steps are being taken by the Tramways Company to carry out their powers for installing a railless trolley system to Manvers Main and Conisborough.

Increase of Speed Required.—The chairman, deputy-chairman, and the general manager of the Liverpool Tramways have been directed to interview the Board of Trade with the object of obtaining an increase in the authorised speed of the cars.

Census of Night Workers at Birmingham.—It is stated that the census of night workers has shown the existence of so large a number of persons so engaged that the Tramways Committee are likely to recommend a trial service of all-night cars at the next meeting of the Council.

A Record at Birkenhead.—At the visit of the King to Birkenhead on March 25 the tramways carried a record number of passengers for one day, viz., 81,148, the receipts totalling £362. In the evening and on other evenings for the remainder of the week an illuminated car traversed various routes.

A London Extension.—The last link in the tramways between London and Woolwich is about to be opened for traffic. Passengers will then be able to journey without a change of car from Blackfriars Bridge to Abbey Wood, nearly fourteen miles. The return fare for the distance will, it is expected, be sixpence.

Result of a Halfpenny Fare Experiment at Hull.—The Tramways Committee have decided to extend halfpenny fares to all routes. On the Hessle Road route an experiment in halfpenny fares during a period of five weeks produced £3 less than for the preceding five weeks. During the same period there was a decrease over all routes of £163, due, it is believed, to unfavourable weather. The totals of 625,036 halfpenny passengers and 427,370 penny passengers were carried on the Hessle Road route, which represented an increase in halfpenny passengers of 377,715, and a decrease in penny passengers of 189,693, the net increase in passengers being 188,022.

Shelters at Aberdeen.—Four shelters which have been erected during the past year have proved to be of great use to tramway passengers. The structures are of a rustic type, and besides providing shelter they have the merit of collecting passengers together. Two additional shelters are now to be erected, at a cost of £70 and £120.

Magnetic Brakes on Open Cars.—All the top-covered cars at Aberdeen are provided with magnetic track brakes, and in order to minimise the liability to accidents Mr. Pilcher, the manager, has obtained sanction to similarly equip the eight largest open top cars. For this purpose the British Thomson-Houston Company's brake is to be fitted, at a cost of £36 per car, in time for the summer traffic.

Proposed Through Service from Manchester to Bolton.—On March 31 a deputation from four urban districts was received by Salford Tramways Committee to urge that arrangements should be made for Salford cars to run through a distance of some 400 yards in the Clifton area from Swinton. This would form a connecting link between the Salford service and that of the South-East Lancashire system, and would complete the connection to Bolton. The financial claims of Clifton have been the hindrance hitherto.

Railless Traction Differences at Brighton and Hove.—Standards and rosettes for carrying the trolley wires are about to be erected by Cedes Electric Traction, Ltd., in Church Road, George Street and Goldstone Villas, Hove, in order to demonstrate the overrunning system. A double-deck car will be utilised. To permit the test to be carried out the Brighton Council have decided to defer for three months their application to the Board of Trade to appoint an arbitrator to decide whether the over-running or the under-running system should be adopted in carrying out the railless traction installation for the two towns.

Municipalisation of Colne Light Railways.—Reference was made by the Mayor of Colne at a meeting of the Council on March 25 to the taking over of the Colne and Trawden Light Railway at the midnight preceding by Mr. F. G. Richardson, the Corporation's tramway manager. The Mayor expressed the hope that the undertaking would be made a success. On March 24 the members of the Council attached their signatures to the cheque for the sum of £92,000, which is to be paid for the railway. The Electricity Committee have appointed a sub-committee to consider the question of providing additional generating plant and a workshop at the sub-station.

Lancashire and Cheshire Municipal Tramway Managers' Association.—The quarterly meeting was held at the Victoria Hotel, Manchester, on March 27, when there were present:—Mr. Mallins (Liverpool) in the chair, Alderman Linsley, J.P. (President of the Municipal Tramways Association), Messrs. Barnard (Bolton), Buckley (Wigan), Clough (Bury), Dugdale (Oldham), Eardley (Stockport), Greene (Wallasey), Holt (Ashton), Kay (Haslingden), Kendrew (Southport), Mozley (Burnley), Pilling (Accrington), Schofield (Stalybridge), Stewart (Rawtenstall), Telfer (Warrington), Holford, of Salford (hon. secretary). Several subjects of a very interesting description were discussed, and at the conclusion thereof a hearty vote of thanks was accorded to Mr. Mallins.

Two-Shift Duty at Leicester.—The Tramways Committee have granted an application made on behalf of the motormen and conductors and the inspectors for their duties to be arranged in two shifts without any reduction of pay. This arrangement will entail the reduction of the working hours on Sundays from nine to seven hours, and will be equivalent to an increase of the rate of pay for Sunday work to time and a quarter. As an experiment for a period of six months, penny return fare tickets are to be issued on the outer stages of the tramways. When the Council adopted the recommendations on March 31, Alderman Flint referring to the rearrangement of the duties in two shifts on Sundays, said that 26 municipal tramway undertakings paid at the rate of time and a quarter, and the committee therefore could not resist the request of the men.

Bristol Council and Tramway Purchase.—Only four members of the Corporation on March 31 voted for a motion by Councillor Witty that the Tramways Option Committee be instructed to submit to the Council the joint report of Messrs. J. B. Hamilton and Snell with reference to the Bristol tramway undertaking. Alderman Pearson, chairman of the committee, stated that that body were unanimously of opinion that it was not at present desirable to give the report to the Council. They were going before Parliament shortly, and it would be an advantage to him if he knew precisely what the nature of the Tramways Company's case was. It would be of great value to the Tramways Company to know precisely what the Corporation case was. He was satisfied that it would be wise to purchase the tramways. Some of the committee had not satisfied themselves in favour of purchase; they required more information.

The Recent Accident at Rochdale.—Colonel Druitt, of the Board of Trade, on March 24 attended at the Rochdale Infirmary and took down the statement of motorman Sansom respecting the accident to a single-deck car at the bottom of John Street. Sansom stated that he went across Yorkshire Street on the hand brake, and pulled up at Pagan Street. He then released the hand-brake and put on the magnetic brake, but found that the wheels were not revolving. He reversed his motor and tried to get current to revolve the wheels in the opposite direction, but the trolley came off. At the curve at the bottom of John Street he felt a jerk at the back of the car, and then he remembered nothing more. Asked by Col. Druitt whether he tried his magnetic brake on the way down from Whitworth before reaching John Street, he replied that he did not. Colonel Druitt expressed the hope that Sansom would soon be about again. He also tested the sanding apparatus of the car.

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Route Numbers.—Route numbers, which can be illuminated at night, are being placed on the Manchester tramcars.

London Omnibuses and Used Ticket Boxes.—At the request of Kensington Borough Council, the omnibus companies of London have asked the police to permit used ticket boxes to be placed on a few services as an experiment.

New Loop at Stalybridge.—Immediately after Easter a loop is to be constructed by the engineer to the Tramways Board in Mottram Road, Stalybridge, in order to deal with the heavy traffic on Saturdays during the football season.

Medical Inspection of Employees.—All men who in future are appointed to the Hull Corporation Tramways are to undergo medical inspection. The Mayor, who is chairman of the Tramways Committee, has informed the Council that all the large municipalities have now adopted medical examinations.

Suggested Underground Railway for Liverpool.—Mr. C. W. Mallins, general manager of the Corporation tramways, has delivered two lectures in the city dealing with a scheme which he has prepared for a system of underground electric railways, estimated to cost thirteen millions sterling. It provides for a belt system of tube railways encircling the city by junctions with the Overhead Railway; for radial lines running through the most populous districts; for an extension of the Mersey Railway to the Haymarket; for railway and general traffic tubes to Birkenhead and Seacombe, forming junctions with the Wirral Railway.

Problem of Unprofitable Routes.—Considerable discussion has taken place at two meetings of Liverpool Corporation upon the following motion :—"That the Tramways Committee be instructed to reinstate forthwith the Heyworth Street tramway service, to be run to the Pierhead, if possible more frequently than formerly, but certainly not less frequently than previous to the service being stopped." After listening to the debate Alderman F. Smith, chairman of the Tramways Committee, said he thought the Council favoured putting the service back, and he withdrew an amendment designed to secure the service only being run whilst it pays its running expenses.

South Western Suburban Railway Electrification.—It is hoped that in the early part of July trial trips may be run on the circular route from Waterloo *via* Wimbledon, Kingston, Twickenham, Richmond, Putney, and Clapham Junction, and back to Waterloo. Although the manufacture of the equipment for the station at Wimbledon is well advanced at the Preston Works of Dick, Kerr and Co., Ltd., the station buildings will not be completed by that time, and current will be obtained from the District Railway's station at Chelsea. Good progress is being made with the electrification of the other suburban routes. At a place between Vauxhall and Waterloo a flying junction will be constructed to carry the electric tracks over the steam lines.

Alcohol Motor Fuel Committee.—The Hon. Arthur Stanley, M.P., chairman of the committee appointed by the Imperial Motor Transport Committee to investigate the possibilities of alcohol as a fuel, has issued a preliminary report. The committee state that the problem would seem to be the production of some mixture of alcohol with an existing fuel, this mixture being suitable for use in the existing type of engine, and serving materially to increase the total fuel supply during the transition period, while the present type of engine is being gradually modified to suit the new conditions. The problem as regards the Empire overseas is regarded as in some respects less complex, since the number of internal combustion engines in use is not so great, and it would, therefore, be more feasible to encourage immediately the use of types designed to suit the new fuel. Denaturing is possibly one of the most important aspects of the subject, and the report suggests that the committee might offer prizes for new methods of manufacture of methyl alcohol, the synthetic production of pyridine, or for other contributions to this class of work. Ultimately the question of denaturing the alcohol will have to be discussed with the Home and Dominion Governments, with a view to a mutual agreement as to the smallest quantity of the cheapest and most satisfactory denaturant which these Governments will allow in a fuel alcohol to be sold on the open market. Reference is also made to the importance of the question of raising crops for alcohol to the agricultural community throughout the Empire.

CONTRACTS AND ORDERS.

Lorain Steel Company have been awarded a contract for 100 tons of tramway rails, with fishplates and joints, to be supplied to Plymouth Council, at £746. Walter Scott, Limited, were the only other tenderers.

Messrs. Bryden and Middleton, Glasgow, have obtained a contract for the ironwork required for the conversion of King Street Barracks, Aberdeen, into a car shed for the tramways department. The amount of their tender was £767.

Derby Council have placed the following contracts :—Babcock and Wilcox, Limited, boiler, £1,000; British Insulated and Helsby Cables, Limited, high-tension cable, £887; and hard-drawn copper; F. W. Brackett and Co., Limited, water screen, £278.

Birmingham Tramways Committee have accepted the tender of the General Electric Company for the supply of 25,000 traction type of Osram lamps. The same company have received a contract for the annual supply of Osram lamps to York Corporation.

Bexley Council have placed with the British Westinghouse Company a contract for the supply of a 500 kw. turbo-alternator, at £3,675. There were eleven tenders, the highest being £5,064. For a water-tube boiler the tender of the Stirling Boiler Company has been accepted, at £1,703. Of five tenders the highest was £2,821.

PERSONAL.

Mr. P. J. Tierney has been commissioned to prepare a municipal electricity supply scheme at Blackrock, Dublin County.

Mr. H. Richardson has accepted the offer made to him by Dundee Corporation to remain in Dundee as city electrical engineer.

Mr. J. W. Hill, J.P., has been appointed chairman of the Dublin and Lucan Electric Railway Company, and Captain C. C. Vesey, D.L., vice-chairman.

Mr. J. A. Robertson, who for ten years has been electrical engineer to Greenock Council, was on April 1 appointed city electrical engineer at Salford at a salary of £1,000 per annum.

Mr. H. Webber, general manager to Keighley Council tramways, and borough electrical engineer, has been recommended by the committee for an increase in his salary from £300 to £400.

Mr. A. W. Szlumper, district engineer to the London division of the London and South Western Railway, has been appointed chief engineer to the company in place of the late Mr. J. W. Jacomb Hood.

Mr. F. Schofield, commercial manager to the Stalybridge, Hyde, Mossley and Dukinfield Tramways and Electricity Board, has been given an advance of £50 in his salary from the beginning of the next financial year.

Gateshead Tramways Directorate.—Mr. C. Shireff Hilton has resigned his position as director of this company owing to pressure of other engagements, and Mr. H. A. Stagg, formerly secretary, has been appointed a director.

Southport Managership.—It is stated that the Tramways Committee have not yet actually adopted the proposal to recommend an increase in the salary of Mr. T. J. Kendrew. The matter will be discussed when the estimates for the coming year are under discussion, by which time Mr. Kendrew will have completed the first year of his re-engagement.

Mr. A. E. Wray, assistant manager of the South Metropolitan Electric Tramways and Lighting Company, Limited, has been appointed general manager of the Gravesend and Northfleet tramways. As a token of the esteem in which he is held by the staff of the South Metropolitan Company a handsome clock has been presented to him with an illuminated address.

Mr. A. Baker on Wednesday gave evidence at Somerset House before the commission on the employment of ex-soldiers. The tramways department of Birmingham have in their employment a large number of ex-soldiers, particularly among the uniform staff; in fact, about one-third of the Birmingham staff are ex-soldiers. Mr. Baker said that he had always found that the ex-soldier usually made an excellent tramway driver or conductor, inasmuch as he was accustomed to discipline and cleanly in his habits. The Army character as a rule could be relied upon.

Mr. Sinclair, general manager of the British Insulated and Helsby Cables, Limited, and his staff, were referred to at the annual meeting of the company by the chairman, Dr. Muspratt, who also mentioned that the company had in hand two important contracts connected with the electrification of the London and North Western Railway and the Melbourne Suburban Railways. The good results for the year, he observed, could not have been achieved without the hard and intelligent work of the general manager and the most loyal co-operation of the other principal officials of the company. Owing to the insufficient supply of workmen's dwellings at Prescot, and the long distance the men had consequently to travel daily, the directors were contemplating the development of a site near the works on town planning lines.

Mr. J. M. McElroy's Report.—In handing to the representatives of the newspapers copies of Mr. McElroy's report on the results of the visit to other British and foreign cities paid by him and Mr. Mattinson, the tramways engineer, to study traffic conditions, Alderman Bowes, the chairman of the Tramways Committee, said the report had been a big task for the general manager and the chief engineer. It had excited the warmest admiration of the committee, who had put on record their appreciation of Mr. McElroy's splendid work. He added that not a line of the report was written in the office, and that it was all the outcome of the time and thought given to the subject by Mr. McElroy at his own home after business hours. To the foregoing statement we may add that in concluding the report Mr. McElroy pays a tribute to Mr. Mattinson and other assistants in the office for the aid which they rendered him.

FINANCIAL REPORTS AND MEETINGS.

Dublin and Lucan Electric Railway.—As the result of the labour troubles in Dublin considerable losses were suffered by this company during the year ended December 31 last, and at the annual meeting on March 26 it was decided to carry the available balance of £109 to the next account, postponing for the present the payment of the cumulative preference dividend.

The British Electrical Federation.—The traffic statement for the week ended March 27, 1914, shows that the receipts from tramways and railways amounted to £38,514, as compared with £44,259 in the corresponding week last year, and from omnibuses £13,034, as compared with £4,614, making a total of £51,548, as compared with £48,873. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year (Easter week) and this year the receipts show a decrease of £5,601 upon the week.

Tynemouth and District Electric Traction Company.—Out of a surplus of £5,500 on a total revenue of £15,028, the directors propose placing to reserve £1,250, paying dividend on cumulative preference shares at rate of 5 per cent. for the year, dividend on ordinary shares at rate of 5 per cent. for the year, carrying for-

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ward £417. Holders of 71 per cent. of the total issued share capital of the company have accepted the Northern Transport Company's offer to exchange the holdings for fully paid shares in the new company, which intends to develop motor transport.

Gratifying Results at Oldham.—Mr. J. W. Dugdale, the general manager, reported on March 27 that the receipts for the year ended March 25 showed an increase of £7,710. The cars had run 24,364 more miles and had carried 1,341,233 more people. 143,601 fewer units of current had been used. The wages bill showed an increase of £4,750. There had been £10,000 to £12,000 spent on the permanent way. The profit on the year's working, subject to audit, was about £5,220. The chairman (Ald. Isherwood) said the statement showed what could be done by managing the undertaking in a businesslike way. He did not think they had yet reached the limit of traffic receipts and economies and the profits that could be made. A big expenditure next year on the permanent way would have to be made.

Gateshead and District Tramways Company.—After deducting £2,860 for renewals, writing off £1,537 for depreciation of investments, and adding £1,828 brought forward, the revenue balance for year ended December 31 was £27,987. The directors place £4,500 to reserve, £2,222 to sinking fund for redemption of mortgages, and recommend a final dividend on ordinary shares at rate of 6 per cent. per annum, making 5½ per cent. for the year, and, in addition, a bonus of 4s. per share, carrying forward £3,708. Holders of 94 per cent. of the total issued share capital accepted the offer of the Northern General Transport Company of December last for the purchase of the company's motor omnibus undertaking, and the profit on the sale has been transferred to reserve. Consequent upon fine weather and good trade in the district, the traffic receipts show a satisfactory increase of £5,867. The undertaking has in all respects been maintained, as in former years, in good order and repair.

(Continued from page 260.)

WALTHAMSTOW URBAN DISTRICT COUNCIL.

ELECTRICITY DEPARTMENT.

The above Council invite tenders for the supply, delivery, and erection at the Electricity Works, Priory Avenue, Walthamstow, of the undermentioned plant:—

Contract "W."—One Water-tube Boiler and Pipework.
Contract "X."—Overhead Bunkers and Conveying Plant
Contract "Y."—Cast-iron Circulating Water Pipes.

Tenderers are at liberty to tender for the whole of the sections or for any section, but not for part of any section.

Copies of the general conditions, specifications, form of tender, and drawings can be obtained from Mr. G. R. Spurr, Electricity Works, Walthamstow, on depositing the sum of two pounds (£2), which amount will be returned on receipt of a *bona-fide* tender, and to the successful tenderer on completion of the contract.

Additional copies of the specification may be had on payment of ten shillings (10s.) for each copy, which amount will not be refunded.

Sealed tenders on the prescribed forms, endorsed "Tender for Contract 'W,'" or as the case may be, must be delivered *by post only* to the undersigned not later than 5 o'clock p.m. on Friday, the 24th day of April, 1914.

The Council do not bind themselves to accept the lowest or any tender.

C. Sydney Watson,
Clerk to the Council.

Town Hall, Walthamstow,
March 31, 1914.

POSITIONS VACANT.

DRAUGHTSMAN.

Wanted, leading Draughtsman, used either to general Rolling Stock work, Tramcar, or Motor 'Bus work. Apply, stating experience and wages required, to "Cars," Falcon Works, Loughborough.

SHIFT ENGINEER.

Shift Engineer required for Three phase E.H.T. Power Station. Applicants must have held a similar position, and have good mechanical as well as electrical experience.

Commencing salary 35s. per week.

Applications, giving full particulars of experience, and copies of references, to the

Derbyshire and Nottingham Electric Power Co.,
Electric Power Station, Ilkeston.

POSITION WANTED.

ENGINEER.

With practical and commercial experience, desires appointment. Several years' experience in Electric Traction work in all details from construction to running. Thoroughly accustomed to management and control of men. Ten years' general manager. Highest testimonials. Box 77, The Tramway and Railway World, Amberley House, Norfolk Street, London, W.C.

Some Blackpool Results.—Up to March 19 the tramways year has shown an increase of £12,798 in receipts. Annual and other tickets increased by £1,050. The receipts per car mile were 1s. 7d., being an advance of 2½d. per car mile on the corresponding period of last year, whilst the increase in passengers was 1,901,835, the total receipts being £83,178. The Tramways Committee have increased the wages of drivers and conductors ½d. per hour. The increase to drivers is from 32s. 6d. per week of 60 hours to 35s., and conductors from 31s. 3d. to 33s. 9d. The increased cost will be about £650 per year. With the six new open cars to be supplied by the United Electric Car Company the number of tourist cars will be twenty-four.

WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended March 28 give total receipts of £225,992, or £13,068 less than in the corresponding week last year. The total length of track was 2,803 miles, or 24 more than for the corresponding week. Receipts were at the rate of £78 18s. 8d. per track mile, a decrease of £5 11s. 9d. as compared with the corresponding week of last year, which included Easter Monday.

COPPER AND ALUMINIUM MARKET.

April 3, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton:—

	Friday, April 3.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	65 15 0 ..	64 17 6 ..	68 2 6
,, ,, (three months)	66 0 0 ..	65 5 0 ..	68 7 6
Electrolytic Copper—bars or ingots ..	68 10 0 ..	67 10 0 ..	71 5 0
Aluminium—bars or ingots	83 10 0 ..	83 0 0 ..	89 0 0

COAL MARKET.

April 3, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows:—

	Friday, April 3.	Last week.	A Year Ago.	Two Year Ago.
London, free into barge in Thames—		s. d.	s. d.	
Best Admiralty Welsh (large) ..	Owing to the miners' strike there are no quotations.	22 6 ..	25 0 ..	Owing to the miners' strike there were no quotations.
Best Seconds		21 9 ..	24 3 ..	
Ordinary Drys		19 6 ..	22 9 ..	
Best Washed Nuts		20 0 ..	21 9 ..	
Best Washed Peas		19 0 ..	20 3 ..	
Cardiff, f.o.b.—				
Best Admiralty (large) ..		18 0 ..	20 3 ..	
Best Seconds		17 3 ..	19 6 ..	
Ordinary Drys		15 0 ..	18 0 ..	
Best Washed Nuts		15 6 ..	17 0 ..	
Best Washed Peas		14 6 ..	15 6 ..	
Newcastle, f.o.b.—				
Best Steams		13 9 ..	17 0 ..	
Best Seconds		11 6 ..	14 6 ..	
Smalls		8 0 ..	11 3½ ..	

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1913.	Latest Return. 1914.	Aggregate. Wks.	Aggregate. 1913-4.	Aggregate. Increase or Dec.
Anglo-Argentine	Mar. 25	£54,218	£56,302	12	£685,255	+ £22,100
Auckland..... (28 days)	Feb. 13	20,117	23,552	33	159,090	— 439
Ballarat and Bendigo	Feb.	4,093	3,893	46	43,543	— 948
Brazilian St. Rly. Mlrs	Feb.	46,044	49,305	30	868,458	+ 57,393
Brazilian Traction.....	Mar. 28	95,467	93,743	13	1,236,038	+ 75,289
Brisbane	Feb.	22,860	25,260	8	53,590	+ 5,920
British Columbia ..... $	Feb.	688,333	704,003	35	6,634,831	+ 352,403
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacroze..	Feb.	40,824	40,877	34	356,923	+ 8,140
Calcutta.....Rs.	Mar. 28	61,404	64,708	12	8,84,622	+ 42,030
Cape Town	Feb	...	13,342	...	...	...
Carthagena & Herreria	March	3,695	2,425	13	8,120	— 1,952
Cordoba.....	Feb.	11,795	12,676	47	145,713	+ 12,767
East India	Feb.	1,622	1,701	30	13,518	+ 516
Kalgoorlie.....	Feb.	2,644	2,169	8	4,509	— 779
La Plata.....	Feb.	4,942	4,768	8	10,062	— 455
Lima.....	Sept.	22,660	34,110	39	300,647	+ 23,783
Lisbon ..... Mlrs.	Jan.	...	156,175	4	126,175	...
Madras (14 days) Rs.	Mar. 31	30,992	28,947	12	168,226	+ 9,821
Melbourne	Dec.	...	69,000	...	...	...
Mexico .....$	Feb.	329,361	553,804	9	1,133,165	+ 242,169
Montevideo.....	March	38,140	32,630	21	170,531	+ 856
Para	Mar. 29	4,007	3,428	17	58,474	— 12,642
Port Elizabeth.....	Feb.	...	3,510	...	...	...
Shanghai .....$	Mar. 25	20,090	23,400	12	284,800	+ 47,164
Singapore .....$	Mar. 28	10,971	11,161	12	156,840	+ 9,089
Toronto .....$	Feb.	718,313	777,633	9	1,625,628	+ 130,387
Winnipeg.....$	Feb.	320,481	350,977	9	733,648	+ 61,720

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Name.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1913-4.	Increase or Dec.
Aberdeen Corporation..	Mar. 25	£1,382	£1,433	+ £51	43	£68 519	+ £3,892
Accrington Corp.....	" 25	666	546	— 120	51	29,253	+ 2,318
Ayr Corporation	" 28	277	231	— 46	45	16,258	+ 2,273
Bath Electric	" 25	685	720	+ 35	12	8,486	+ 164
Birkenhead Corp.	" 29	1,312	1,773	+ 461	52	67,392	+ 6,350
Birmingham Corp.	" 28	12,617	12,479	— 138	52	621,804	+ 51,493
Blackburn Corporation	" 25	1,885	1,235	— 650	52	66,820	+ 4,693
Blackpool Corporation	" 26	2,505	537	— 1,968	50	83,715	+ 10,831
Bolton Corporation	" 29	2,631	2,596	— 35	52	141,434	+ 6,965
Bournemouth Corp.....	April 1	1,837	1,756	— 101	52	104,353	+ 8,658
Bradford Corporation...	Mar. 28	6,954	5,808	— 1,146	52	306,067	+ 17.733
Brighton Corporation..	" 29	1 097	828	— 269	52	54,351	+ 2.701
Bristol	" 27	9,570	7,412	— 2,158	12½	90,342	+ 3,731
British Elec. Federatn.	" 27	48,873	51,548	*	...	...	
Burnley Corporation ..	" 28	1,526	1,541	+ 15	52	87,671	+ 8,354
Burton-on-Trent Corp.	" 29	291	271	— 20	52	15,238	+ 762
Bury Corporation.....	" 29	1,357	1,253	— 104	52	69,508	+ 2.194
Cardiff Corporation....	" 21	2,450	2,653	+ 203	51	137.876	+ 12,453
Chatham and District..	" 26	994	834	— 163	12	9,761	— 422
Chesterfield Corp.	" 31	442	434	— 8	52	13,528	+ 1,379
Colne & Trawden.....	" 21	323	240	— 83	11	2.846	+ 27
Cork Electric.....	" 26	484	445	— 39	12	5 386	— 16
Croydon Corporation ..	" 20	1,470	1,507	+ 37	50	82.265	— 5.792
Darlington Corporation	" 28	254	247	— 7	52	12 931	+ 1 133
Derby Corporation	" 28	1,097	928	— 169	52	50,659	+ 4,101
Dover Corporation	" 27	256	213	— 43	52	12,333	+ 26
Dublin & Lucan	" 27	177	110	— 67	12	1,387	— 104
Dublin United	" 27	5,886	5,173	— 713	13	64,206	— 2.782
Dundee City	" 25	1,214	1,245	+ 31	45	58,511	+ 3.869
East Ham Corporation	" 28	1,158	1,010	— 148	52	53.623	— 2,724
Exeter Corporation	" 27	398	295	— 103	52	17,320	+ 694
Gearless Motor 'Buses.	" 28		488	...	13	5 636	...
Glasgow Corporation ..	" 28	20.404	21,349	+ 945	43	879.563	+ 61,069
Glossop(U.Elec.Supply)	" 28	129	116	— 13	13	1 550	— 36
Halifax Corporation ...	" 24	2,755	1,928	— 827	51	106,623	+ 2,270
Hastings & District.....	" 25	1,381	757	— 623	12	8,497	— 687
Huddersfield Corp.	" 28	2,730	2,129	— 601	52	104,421	+ 5,169
Hull Corporation	" 28	3,149	3,141	+ 8	52	164,705	+ 8.214
Ilford U.D.C.	" 28	490	458	— 32	51	23,305	— 858
Ilkeston Corporation ...	April 1	109	123	+ 14	1	123	+ 14
Ipswich Corporation ...	Mar. 28	467	380	— 87	52	23,047	+ 630
Isle of Thanet	" 28	562	362	— 200	26	8.644	+ 257
Kilmarnock Corp.	" 28	166	158	— 8	45	7.875	+ 484
Lanarkshire	" 26	1 704	1,861	+ 157	12	22.092	+ 2,793
Lancashire United	" 25	1,967	1,534	— 433	12	18,407	+ 1.806
Leeds City	" 28	8,991	8,085	— 906	52	420,170	+ 16,093
Leicester Corporation...	" 28	3,214	2,880	— 334	13	34,731	+ 1.336
Leith Corporation	" 28	649	668	+ 19	45	31,819	+ 1,501
Leyton U.D.C.	" 19	1,229	1,230	— 9	50½	66,888	+ 360
Liverpool Corporation..	" 28	12,692	13,540	+ 848	12	158,611	+ 8,706
Llandudno & Colwyn B.	" 27	420	163	— 257	17	2 591	— 309
London County Council	" 25	41,227	43,694	+ 1,467	50	2,165,810	+ 20.276
London Gnl. Omnibus..	" 28	58,219	58,783	+ 564	13	709,807	+ 3 027
London United	" 27	6,922	5,540	— 1,382	13	66,436	— 560
Lowestoft Corporation	" 28	172	149	— 23	25	4,503	+ 367
Maidstone Corporation	" 19	159	159	Nil	51	9.938	+ 647
Manchester Corp.....	" 28	17.827	17,875	+ 48	52	909,257	+ 37.795
Met. Elec. Trys.	" 27	9,846	8,798	— 1,048	13	103,897	— 1,036
Nelson Corporation.....	" 30	245	260	+ 15	52	10.802	+ 562
N'castle-on-Tyne Corp.	" 28	5,136	5,041	— 95	51	256,103	+ 22.108
Newport (Mon.) Corp....	" 25	902	780	— 122	52	39.819	+ 2.423
New St. Helens & Dist..	" 25	972	738	— 234	39	31.315	+ 2.513
Northampton Corp	" 27	682	522	— 160	52	29,518	+ 1,549
Nottingham Corp.	" 26	3,914	3,393	— 421	51½	171.907	+ 6,794
Oldham Corporation ..	" 29	1,783	1,566	— 217	1	1,566	— 217
Portsmouth Corp.....	" 28	2,350	1,922	— 428	52	114.419	+ 7.076
Preston Corporation ..	" 25	921	805	— 116	52	45.543	+ 2,646
Provincial	" 28	2,111	1,665	— 446	52	43,385	+ 1,583
Reading Corporation ..	" 26	735	662	— 73	51	35 642	+ 2,431
Rochdale Corporation	" 28	1,662	1,487	— 175	52	82,098	+ 2.130
Rotherham Corp.....	April 1	864	844	— 20	52	52,253	+ 9,468
Salford Corporation ..	Mar. 30	4,887	5,182	+ 295	52	271 054	+ 12 155
Sheffield Corporation...	" 29	7,912	7,495	— 417	1	4,198	+ 234
Southampton Corp.....	" 25	1,344	1,168	— 176	51	66.679	+ 3.324
Southend-on-Sea Corp.	" 25	930	711	— 219	52	46.754	+ 7.756
South Met. Trys.	" 27	950	1,002	+ 52	13	12,054	+ 3.052
South Shields Corp.....	" 28	736	690	— 46	52	37,252	+ 4.054
Sunderland Corp.....	" 29	1,391	1,322	— 69	52	74,390	+ 6.138
Sunderland District ...	" 25	727	530	— 197	21	11 849	+ 999
Swindon Corporation ..	" 28	190	163	— 27	51	8,457	+ 443
Trys. (M.E.T.) 'Buses	" 28	2,302	8,655	+ 6,353	13	101.537	...
TynesideTrys.&Tmrds	" 25	899	471	— 428	12	5,685	+ 226
Wallasey Corporation	" 28	1,238	1,214	— 24	52	62 334	+ 5,433
Walsall Corporation ...	" 28	787	602	— 185	13	7 851	— 3
Walthamstow U.D.C....	" 28	819	723	— 96	52	38,328	+ 1,460
Warrington Corp	" 26	476	428	— 48	51	22,929	+ 336
West Ham Corporation	" 28	2,924	2 725	— 199	51	139,859	+ 4,158
Wigan Corporation	" 26	1,641	1.528	— 113	51½	76,859	+ 6,484
Wolverhampton Corp	April 1	996	1,036	+ 40	1	1.036	+ 40
Yorkshire (W. Riding)	Mar. 29	1,734	1,368	— 366	13	18,429	+ 960

* From such of the services as were working both last year and this year the receipts show a decrease of £5,691 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

Name.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London.....	Mar. 28	£4,675	£5,224	+ £549	13	£67,773	— £1.575
City and South London	" 28	2 999	2,715	— 284	13	37,028	— 2.209
Liverpool Overhead.....	" 29	1,638	1,687	+ 49	13	21,266	+ 653
London Electric.....	" 28	14.080	14,835	+ 755	13	190.780	+ 2.510
Mersey	" 28	2.119	2,188	+ 69	13	29.236	+ 111
Metropolitan	" 29	16,104	17.662	+ 1 558	13	231,724	+ 20,539
Metropolitan District..	" 28	12,829	13.834	+ 1.005	13	172 470	+ 1.535

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TRAMWAY AND OMNIBUS SHARE LIST.

Paid.	Name.	On Week	Quotations, April 3.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	— 1½	69 — 71
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	— ⅛	4⅝ — 5⅞
5	Do. 5½% Cum. 2nd Pref.	...	4⅜ — 4⅝
100	Do. 4% Deb. Stk. Red.....	...	92½ — 94½
100	Do. 4½% Deb. Stk. Red.....	...	97 —100
100	Do. 5% Deb. Stk. Red.....	...	96½ — 98½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 —106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅞ — ⅝
1	Do. 5% Cum. Pref	...	⅛ — ¾
100	Do. 4½% 1st. Mort. Deb. Stock, Red.....	+ 1	69 — 74 xd
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	— 2	84 — 86
10	Blackpool and Fleetwood Tramroad Co.	...	14 — 15
	Bombay Elec. Supply and Trams. Co., Ord.	...	13½ — 14⅛
10	Do. do. 6% Cum. Pref.....	...	10¾ — 11¼
100	Do. do. 4½% Db. Stk Rd.	...	94½ — 96½
$100	Brazilian Traction Light and Power Co. Lim.....	...	85¾ — 85⅞
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	— ⅛	7⅛ — 8
5	Do. do. 5% Cum. Pref	...	4⅞ — 5⅜
100	Do. do. 4½% 1st Deb Stock, Red. ...	...	98 —101
10	Bristol Tramways and Carriage Co.	...	6¾ — 7
10	Do. do. 4% Cum. Pref.	...	6⅞ — 7⅛
100	Do. do. 4% Deb. Stock	...	100 —102
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	+ 2	117 —121
100	Do. Pref. Ord. Stock	+ 1	105 —109
100	Do. 5% Cum. Perpetual Pref. Stock.....	...	101 —104
100	Do. 4½% 1st Mort. Debs.	...	98 —101
40	Do. 4½% Vancouver Power Debs.....	...	94 — 98
100	Do. 4½% Perpetual Cons. Deb. Stk.	— 1	93½ — 95½
100	British Elec. Traction Co., Lim., 6% Cum. Pref.....	...	89 — 92
100	Do. 7% Non-Cum. Pref.	...	56 — 59
10	Do. 6% Pref. Ord. Non-Cum.	...	15½ — 17⅛
100	Do. Deferred Ord. Stock	...	6¼ — 8¼
100	Do. 5% Perpetual Debenture Stock.....	— 1	93 — 95 xd
100	Do. 4½% Second Debenture Stock, Red	...	79 — 82
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	73 — 78
100	Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb.	...	100 —102
5	Calcutta Tramways Co., Limited. Ord.	...	6¼ — 6¾
5	Do do. 5% Cum. Pref.	...	5 — 5¼
100	Do do. 4½% 1st Deb. Stock, Red.	...	96 — 99
1	Cape Electric Tramways, Ld., ...	...	⅝ — ¾
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	3 — 3¼
100	Do. 5% Debs. Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co. (1904), Lim.	...	5¼ — 5¼
100	Do. 4% Debenture Stock Red, 1985	...	91 — 96
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. ...	...	89 — 93
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	+ 1	93 — 96
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	— 6⅞
10	Dublin United Trams. Co. (1898) Lim. Ord.	...	— 11⅛
10	Do. do. 6% Pref.	...	— 12⅜
100	Do. do. "A" Red.	— ¼	— 80½ xd
100	Do. do. Deb. Stock "B" Red. ..	...	— 79
10	Gateshead & Dist Trys. Co., Ord.	+ ¼	9 — 9½
10/-	Hastings & Dist. Electric Trams. Co., Ld., Ord.	...	⅜ — ⅝
1	Do. do. 6% Cum. Pref.	...	⅛ — ¾
100	Do do 4½% Deb. Stk. Red.	— 2	65 — 70 xd
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	93½ — 97½
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.).....	...	86 — 90
10	Imperial Tramways, Ord.	...	3 — 3½
10	Do do. 6% Cum. Pref.....	...	6¼ — 6¾
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref....	...	2 — 2½
100	Do. 4% Debenture Stock	...	71 — 76
1	Kalgoorlie Elec. Trams., Ltd.	...	0 — ⅛
100	Do. do. 5% "A" Deb. Stk.	...	85 — 90
100	Do. do. 6% "B" do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.....	...	⅞ — 1
10	Lanarkshire Tramways Co.	...	9¾ — 10¼
100	Lancashire United Tramways. 5% Prior Lien Deb.	...	87 — 89
1	Lisbon Electric Trams., Lim., Ord.....	...	1⅛ — 1⅜
1	Do. 6% Cum. Pref.	...	⅛ — 1⅛
100	Do. 5% Mort. Debs.	...	91 — 96
1	London and Suburban Trac. Co., Lim., Ord.	...	⅞ — ⅞
100	London General Omnibus Company, Limited, 4½% Deb.	...	97½ — 99¾
100	Do. Do 5% Cum. Inc. Deb. Stk. Red.	...	89 — 92
100	London United Trms.(1901) Ltd., 4½ 1st Mt. Deb. Stk. Red	...	60 — 64
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref.....	...	4⅞ — 5¾ xd
5	Do. do. 5% Deb. Stk., Red.	...	101 —103
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	79 — 82
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	...	107 —110
$1,000	Do. do. 5% Bds.	...	99⅛ —100¼
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	1⅛ — 1⅜
100	Metropolitan Elec. Trms. Ltd..4½% Deb. Stock, Red. ..	...	89 — 92
100	Do. 5% Deb. Stock, Red. ..	...	85½ — 88½ xd
100	Mexico Tramways Co., Common Stock	...	74 — 77
500	Do. Gen. Con. 1st Mort. Gld. Bonds	+ 1	79 — 83
100	Do. 6% 50-yr. Mort. Bonds	...	78 — 83
...	Michigan United Railways 5% 1st Mort. Gld. Bonds ...	...	91½ — 93½
100	Montreal Street Railway, Sterling 4½% Debs. (1922).....	...	93 —100
100	Do. 4½% Sterling Debs, (1922) ..	...	99 —101
1	National Steam Car Co. Ltd.	+ ⅜	⅜ — ⅝
10	Oldham—Ashton and Hyde Elec. Ord.	...	6 — 6½
10	Do. do. 5% Cum. Pref.	+ ⅛	5⅞ — 6⅛
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	3¾ — 4¾
5	Do. do. 6% Cum. Pref.	...	4 — 4½
1	Perth (W.A.) Elec. Trams.. Ld., Ord.....	...	—
1	Potteries Electric Traction Co., Ltd., Ord.	...	¾ — ⅞
1	Do. 5% Cum. Pref.	...	¾ — ⅞
1	Do. 4½% Debenture Stock, Red.	...	84 — 87
130	Provincial Tramways, Lim., Ord.	...	⅛ — ⅛
1	Do. 5% 1st Deb. Stock	...	95 — 98
10	Puebla Tramway, Light & Power Co., Prior Lien 5%...	...	77 — 82
...	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.....	...	5 — 5½
5	Do. do. 4½% 1st Mt. Db. Stk.	...	95 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	— 2	87 — 89 xd
100	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	— 2	97 — 99
$500	Do. do. 5% 50-yr. Mort. Gold Bonds	+ 1	89 — 91
100	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	— 1	93 —101
100	Do. 5% 1st Mort. Debs., Red., 1929	...	96 — 99
$50	Shanghai Elec. Construction Co.	...	12¾ — 13¼
10	Singapore Elec. Tramways Lim., 5% Debs. Red	...	88 — 92 xd
100	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ...	...	⅝ — ¾
	Do. do. 4% Deb. Stk.....	...	66 — 70
100	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	95 — 97
..	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	98 —100
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	83 — 85
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	92 — 94
100	United Elec. Tramways of Monte Video, Ord.....	...	4⅝ — 5⅛
5	Do. do. 6% Cum. Pref.....	...	4⅞ — 5¼
5	Do. do. 5% 1st Deb. Stk. Red.	...	94 — 97
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	93½ — 95½
100	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	⅞ — ⅞
5	Do. do. 6% Cum. Pref.....	...	4 — 4½
5	Do. do. 4½% 1st Deb. Stock. Red.....	...	83 — 86
100			

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

FOUNDED 1892. LONDON, APRIL 9, 1914. VOL. XXXV

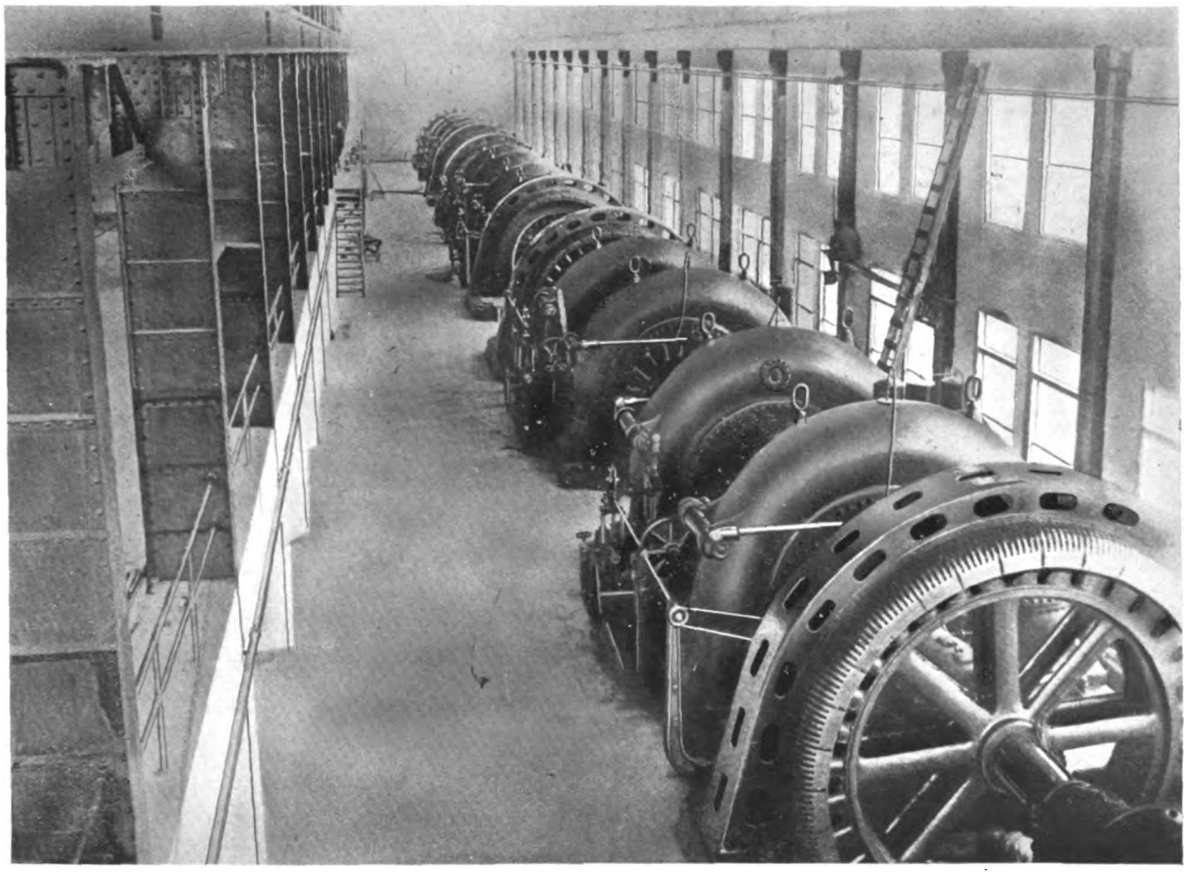
THE FIRST 2,400-VOLT DIRECT-CURRENT RAILWAY IN AMERICA.

ELECTRIFICATION OF THE BUTTE, ANACONDA, AND PACIFIC RAILWAY.

The Butte, Anaconda, and Pacific Railway is not only the first 2,400-volt direct-current road in America, but it is also credited with being the first steam railway operating both freight and passenger schedules to electrify its lines purely for reasons of economy. The electrification of many railways has been made because of special factors, such as the existence of tunnels, the overcrowding of termini, or for rapid suburban service. This road, however, cannot be classed as an "enforced electrification," since no such special limitations have been the determining factors.

The first electric locomotives were put in service on May 28, 1913, hauling ore cars between the East Anaconda yards and the smelter. During the first seven months of service, they made approximately 201,000 miles, and hauled about 2,365,000 tons of ore. The change from steam to electric haulage was made without any change in the personnel of the crews, and without any delays or alterations in the schedule.

The electrified lines of this system extend from the Butte Hill yard to the smelter, a distance of 32 miles. There are numerous sidings, yards, and smelter tracks that have been equipped with overhead trolley, making a total of about 95 miles of track.



Six 6,000-h.p. Generating Units in the Station Supplying Energy for the Railway.

The railway is essentially an ore-hauling road, the freight traffic from this source originating at the copper mines situated near the top of Butte Hill. From the mines the ore trains are lowered down the mountain a distance

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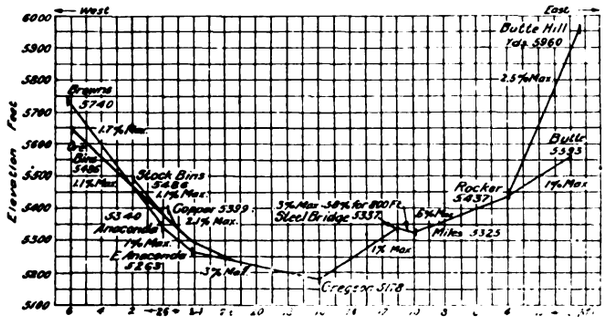
of 4½ miles to the Rocker yards, which are a few miles west of the city of Butte. At this point, new main-line trains are made up for transportation to the smelters at Anaconda. The main line division extends through a rough mountainous country, a distance of about 20 miles, with grades as high as 1 per cent. At East Anaconda the main line trains are broken up and hauled up Smelter Hill to the stock bins, where each car is run over the scales and weighed. The shifting of cars in connection with weighing and subsequent delivery to the contractors is done by single locomotives. The east-bound traffic consists in returning empty cars



Profile of Railway.

to the mines and the transportation of copper ingot to the Butte yards, where it is shipped over other roads to refineries.

Between the cities of Butte and Anaconda, which are situated at the ends of the electrified portion of the system, there is considerable local traffic, both passenger and freight. The city of Butte and vicinity has a population of about 65,000, and Anaconda about 10,000. At Butte, the Butte, Anaconda, and Pacific connects with the Great Northern Railway, the Northern Pacific, and the Chicago, Milwaukee, and St. Paul Railroad, and at Silver Bow, about six miles from the city, connection is made with the Oregon Short Line. For a distance of 16 miles the Butte, Anaconda, and Pacific Railway is paralleled by the trans-continental lines of the Northern Pacific and the Chicago, Milwaukee, and St. Paul. The last named company have already contracted for power for the operation of electric trains from Harlowton, Montana, to Avery, Idaho, a distance of 440 miles.

The maximum curvature on the system (20 degrees, 285 ft. radius) occurs on the Butte Hill line. On this part of the road there is an average curvature of 6 to 10 degrees. The locomotives are designed with sufficient flexibility to take a curve of 51 degrees (180 ft. radius) at slow speed. The nature of the gradients may be gathered from the profile map.

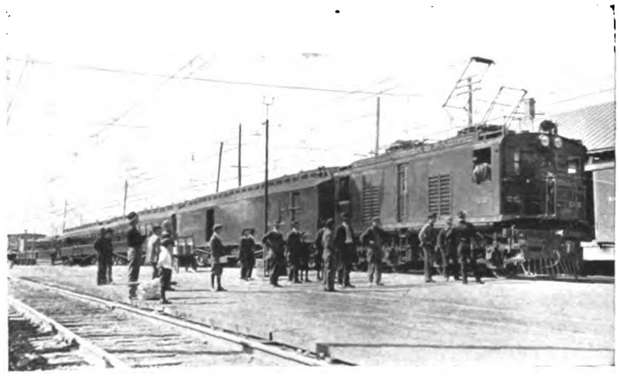
Train Service.

The freight traffic consists largely of copper ore, and amounts to more than 5,000,000 tons per year. This material is handled in steel ore cars weighing about 18 tons and having a capacity of 50 tons each. Trains of 30 loaded cars weighing 2,000 tons are made up at the Butte Hill Yards and hauled by two-unit locomotives to the Rocker yards, where 4,000-ton trains are made up for the main line. At the East Anaconda yards the trains are again broken up, and 1,400-ton trains are sent up Smelter Hill to the ore bins. All the shifting and "spotting" cars, at the smelters and in the sorting yards, is done by single locomotive units. The customary train make-up for both east and west bound traffic is shown in the accompanying table.

Condensed Information of Freight Movement.

	West Bound.			East Bound.		
	Butte Hill Line.	Main Line.	Smelter Hill.	Smelter Hill.	Main Line.	Butte Hill Line.
Trailing load in tons	2,000	4,000	1,400	1,000	1,260	650
Number of cars	30	60	20	55	70	35
Number of 80-ton locomotives per train	2	2	2	2	2	2
Approximate grade against load	2·5 %	0·3 %	1·1 %	1·1 %	1 %	2·5 %
Approximate speed on level tangent track, miles per hour	..	21	..	..	25	..
Approximate speed on maximum grade	12	16	16	20	16	16
Average trolley voltage	2,200	2,200	2,200	2,200	2,200	2,200
Length of run in miles	4·6	20·1	7	7	20·1	4·6

Eight passenger trains per day are operated between Butte and Anaconda, four in each direction. The main line trains were first hauled by electric locomotives on October 1, 1913, and promptly demonstrated their ability to make better time than was possible with steam engines. Single locomotives are used, hauling trains of from three to five passenger and baggage cars.



Single-Unit Locomotive and Passenger Train at Butte Station.

Two-Unit Electric Locomotive Hauling Freight Train.

Power Supply.

Energy for the operation of electric trains is purchased from the Great Falls Power Company. The generating plant is located at Great Falls, Mont., on the Missouri River, and has for some time been supplying electric power for the operation of the mines and smelters at Butte and Anaconda. Six hydro-electric units are installed, having a nominal rated capacity of 21,000 KW. The machines are of the horizontal type, generating 6,600 volts, three-phase, at a frequency of 60 cycles. The power is stepped up to 102,000 volts for transmission to the transformer sub-station at Butte, a distance of 130 miles, over two separate parallel lines constructed on the same right of way. An extension of the system transmits power at 60,000 volts to a

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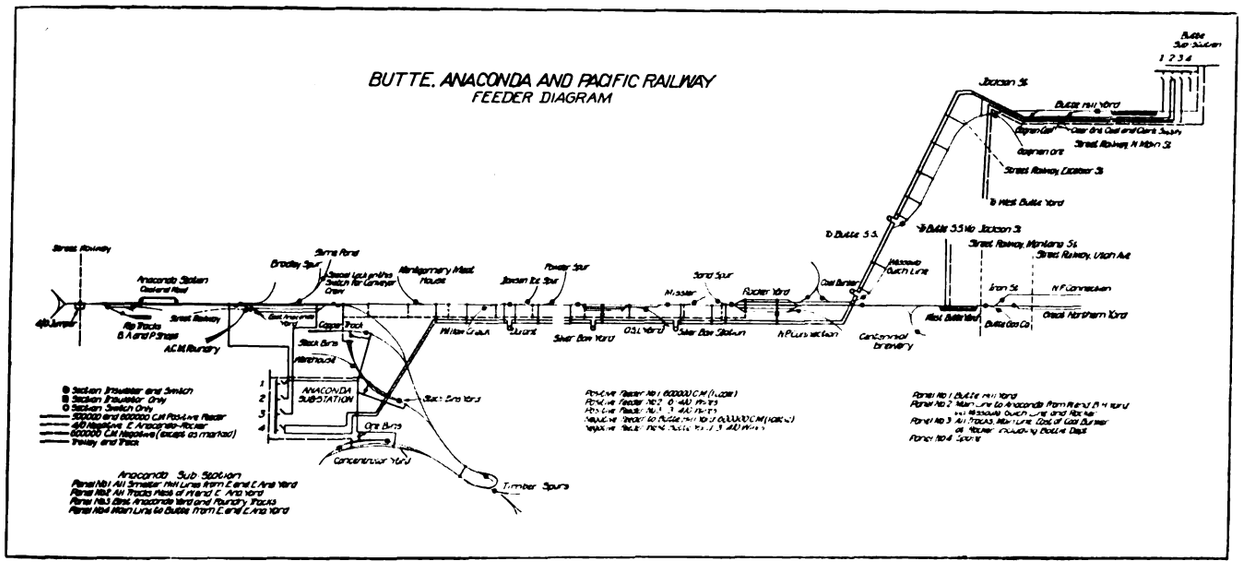
second transformer station at Anaconda, 26 miles farther on.

The Butte station forms the centre of the extensive power system worked by the Montana Power Company. Besides the Great Falls' 102,000-volt transmission lines, there are several 60,000-volt transmissions terminating at this point, which form a part of the Montana Power Company's system. These lines bring in power from the Hauser Lake, Canyon Ferry, Madison, and Big Hole plants. At the Butte sub-station this power is stepped down to 2,400 volts, three-phase, and all of these lines are tied in on the 2,400-volt alternating-current bus-bar. Ample protection is therefore afforded from interruption of service.

It is an interesting fact that the railway load was taken on without any increase in the high-tension transmission facilities. It is estimated that the additional load from this source is approximately 20 per cent. of the railway, industrial, and lighting load furnished by the street railways, mines, and smelters at Butte and Anaconda.

Railway Sub-Stations.

The two existing sub-stations at Butte and Anaconda were used to house the 2,400-volt motor-generator sets



Feeder Diagram.

required for operating the electric trains, so that no additional buildings were constructed for this purpose. Power is furnished by two 1,000-KW. 3-unit motor-generator sets in each sub-station, taking power from the 2,400-volt alternating-current buses. These units operate continuously 24 hours per day, seven days of the week, to supply the necessary current for train operation. Each set consists of a three-phase, 60-cycle, 1,450-K.V.A., 720 revolutions per minute, synchronous motor direct connected to two 500-KW. 1,200-volt generators, insulated to operate in series for 2,400 volts. The generators are compound wound, and have both commutating poles and compensating pole face windings. These fields are connected on the grounded side of the armature, and the main fields are separately excited from 125-volt exciters.

The 1,200-volt generators are provided with heat-proof insulation and, owing to their unusually good commutating characteristics, will carry three times normal load for periods of five minutes, as well as the usual 50 per cent. overload for two hours.

An automatic voltage regulator is used to maintain an approximately constant voltage at the terminals of the motor by power factor regulation. The motors are protected against overload by inverse time limit relays, which are set to open at four times normal load. These relays have been adjusted to open under sustained overload in about two seconds, and upon short circuit their action is practically instantaneous.

Excitation for the two generating units in each sub-station is obtained from two induction motor-driven sets, rated at 50 KW. each at 125 volts. One set is used for supplying current to the synchronous motor fields, and is controlled by the automatic voltage regulator. The second unit supplies current to the separately excited fields of the direct-current generators.

Switchboards.

The 2,400-volt switchboards for controlling these sets are the first direct-current boards to be constructed for this high voltage. In general, they are similar to the standard 600-volt types, with increased insulation and special provision for interrupting the 2,400-volt current. The circuit breakers and switches are also arranged for remote control, and all apparatus on the panels is provided with ample insulation to insure safety to operators.

The 2,400-volt circuit breakers and switches are installed on separate panels above and behind the main panels, and are operated by connecting rods from handles mounted on the front of the main switchboard. These handles are similar in appearance, and, to avoid confusion, the circuit breaker handles are inverted. The breakers are equipped with special magnetic blow-outs and arc chutes, and provision is also made for automatically inserting a high resistance in the generator field at the same instant that the main circuit breakers open, thus reducing the generator voltage.

The alternating-current switchboard contains two panels for controlling the synchronous motors by means of remote control, solenoid-operated oil switches; two panels for the motor fields, and a panel for the automatic voltage regulator. These panels also contain other necessary instruments, including frequency and synchronism indicators, ammeters, wattmeters, and relays.

Overhead Construction.

The overhead construction for this system was especially designed to give the flexibility necessary for satisfactory operation of the pantagraph trolleys used on the locomotives. The 4/o grooved copper trolley

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wire used over all tracks is supported by an 11-point catenary suspension from a stranded steel messenger cable. Both side-bracket and cross-span construction are used as required by the local conditions. There is a large amount of special work on account of the many yards and sidings, and in one case 12 tracks are

Steel Bridge at Washoe Smelter.

spanned. The cross-span construction used at this point is supported by a third pole between the eighth and ninth tracks. The hanger used on the straight line construction is a rolled-steel strap looped over the messenger wire. This loop is closed at the ear and the wire is clamped in place by a single bolt. Special pull-offs are used to increase the flexibility of the suspension.

The section breakers were designed for the 2,400-volt service, and at six points insulated crossings are necessary at the intersection of the 2,400-volt trolley with the 600-volt trolley of the city system. On the main line a very simple section insulator is used. This consists of paralleling the two trolley wires from the ends of each section at a suitable distance for insulation so that the pantagraph bridges the two circuits for a short distance, thus avoiding interruption of the power supply to the locomotive. The construction in the yards and sidings is simplified by paralleling the trolley from the side tracks for a short distance along the main line. This avoids the use of switch plates or similar devices. At some of these junction points the pantagraph engages as many as six trolley wires.

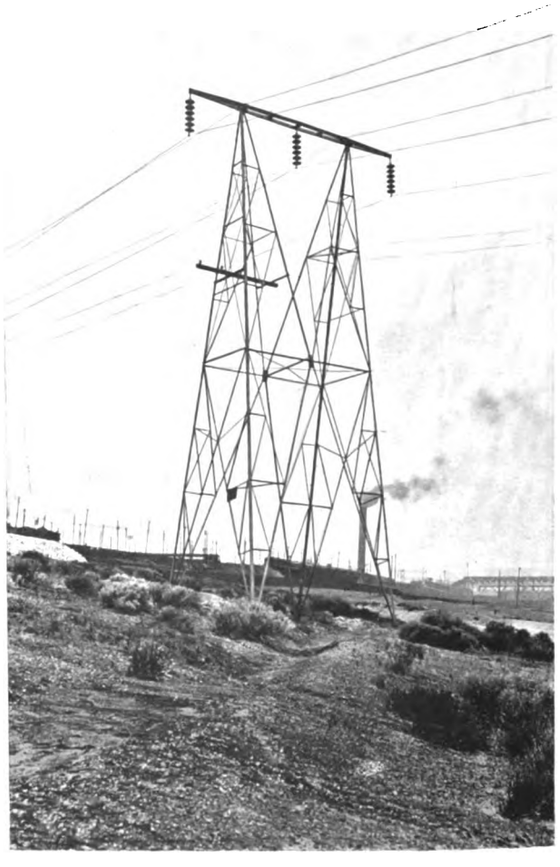
The overhead lines are protected from lightning by 2,400-volt direct-current type ME arresters installed on poles at intervals of one-third of a mile the entire length of the system.

Feeders.

The feeder lay-out with section insulators, switches, etc., is shown in the diagram. The 4/0 trolley is reinforced between the sub-stations with two 500,000 c.m. bare copper cables tapped to the trolley at intervals of 1,000 ft. A 4/0 negative return wire is also installed between Rocker and East Anaconda. This wire is carried on the trolley poles and is connected to the cross bonds at intervals of 1,000 ft. The rails are connected by 4/0 bonds at every joint. The sub-stations are normally connected together by these feeders, allowing an interchange of current. In emergency either station can supply current to the entire system.

Locomotives.

The equipment consists of 17 80-ton units (2,000 lb. to the ton), 15 for the freight and two for passenger service. The freight locomotives are geared for slow speed, and are operated in pairs for the main line service. The maximum free-running speed is 35 miles per hour. The two passenger locomotives are of the same construction as the freight units, but are geared for a maximum free-running speed of 55 miles per hour.



Steel Transmission Tower Carrying 100,000-Volt Lines to Butte.

A speed of 45 miles per hour is made with three passenger coaches on straight level track. The continuous tractive effort of a single 80-ton freight locomotive is 25,000 lb. at 15 miles per hour. The maximum tractive effort for a period of five minutes is 48,000 lb., based on a tractive coefficient of 30 per cent.

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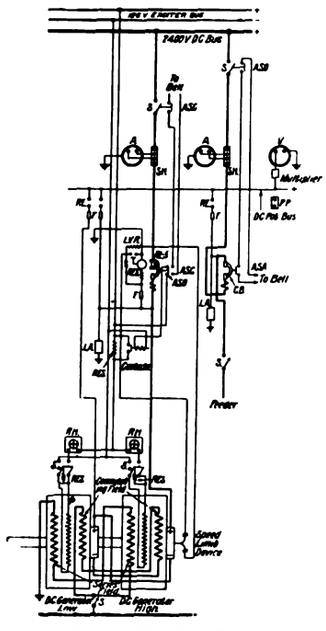
These locomotives are of the articulated double-truck type, with all the weight on drivers. The cab contains an engineer's compartment at each end, and a central compartment for control apparatus. This cab is of the box type, extending the entire length of the locomotive, and is provided with both end and side doors. The entire weight of the locomotive is carried on semi-elliptic springs suitably equalised.

Eight Tracks in the Butte Yard.

The central channels forming a part of the under-frame are enclosed, and are utilised as a distributing air duct for the forced ventilation of the motors. The air is conducted through the centre pins, which are hollow, into the truck transoms, and thence to the motors. The engineer's compartment at either end of the car contains the operator's seat, controller, air brake valves, bell and whistle ropes, ammeter, air gauges, sanders, and other control apparatus within immediate reach of the engineer.



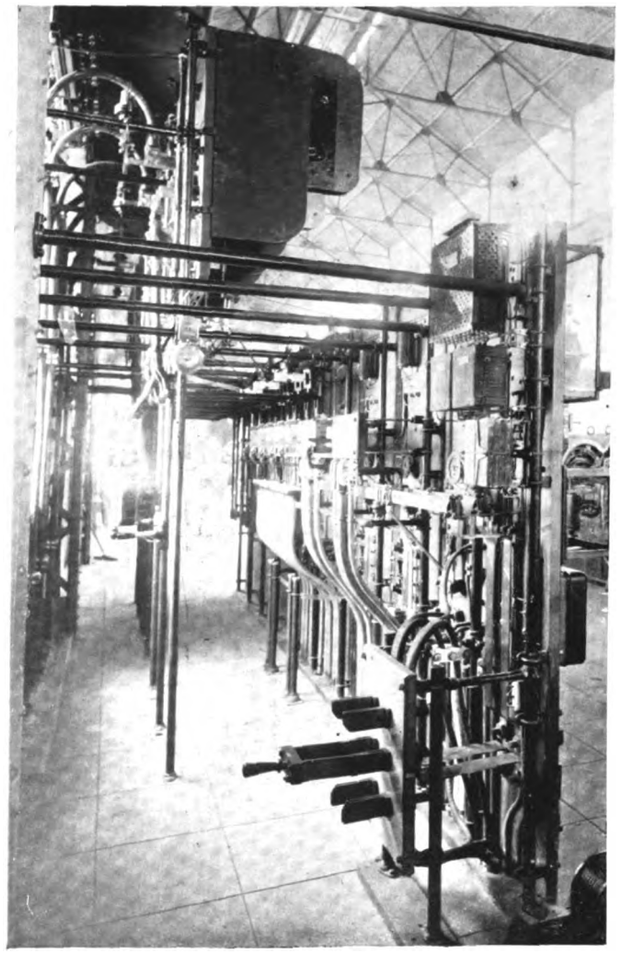
Sub-Station Wiring Diagram.

The contactors, reverser, and rheostats, which are all located in the central portion of the cab, are mounted in two banks running lengthwise of the compartment, and are conveniently arranged for cleaning, inspection, and repair. All apparatus and circuits carrying 2,400 volts are thoroughly protected from accidental contact.

The motors are of the G.E.-229-A. commutating pole type, wound for 1,200 volts and insulated for 2,400 volts. This motor was designed for locomotive service, and is provided with forced ventilation. The method of ventilation is similar to the well-known ventilated motors, but the volume of air circulated is increased by the use of an auxiliary blower mounted on an extension of the dynamotor shaft. The gear reduction on the freight locomotive is 4·84, and on the passenger locomotive 3·2. The double unit, 160 ton locomotive is capable of giving a continuous sustained output of 2,100 H.P. The motors are connected to the driving wheels by twin gears similar to those used on the Detroit River Tunnel, Baltimore and Ohio, and the Great Northern locomotives.

The control equipment is Sprague General Electric type M, multiple unit, operating the four motors in series and in series-parallel. Two 1,200-volt motors are permanently connected in series. The controller provides ten steps in series and nine in series-parallel. The transition between series and series-parallel is effected without opening the motor circuit, and there is no appreciable reduction in tractive effort during the change. The transfer of circuits at this point is made by a special change-over switch, which is operated electro-pneumatically.

The 2,400-volt contactors are operated from the 600-volt control circuit, specially constructed to separate the parts from the coils and interlocks which carry the



2,400-Volt D.C. Switchboard in Butte Sub-Station.

600-volt current. The necessary insulation is obtained by large clearances and by the use of porcelain and mica insulation. The armature is connected to the contact lever by a wooden rod. The contacts, magnetic blow-out, and arc chutes are also especially designed to rupture the 2,400-volt arc.

Current is collected by overhead roller pantagraphs, pneumatically operated and controlled from either engineer's compartment by an air valve. A 2,400-volt insulated bus line runs along the centre of the cab roof. These bus lines are connected together by couplers between the two freight units, so that current may be obtained from either one or two collectors. The air brakes are the combined straight and automatic type; and the compressor is of the CP.-26, 600-volt type, having a piston displacement of 100 cubic ft. of air per minute when pumping against a tank pressure of 135 pounds. Radiating pipes are provided on the roof of the cab for reducing the temperature of the compressed air before it reaches the high-pressure cylinder.

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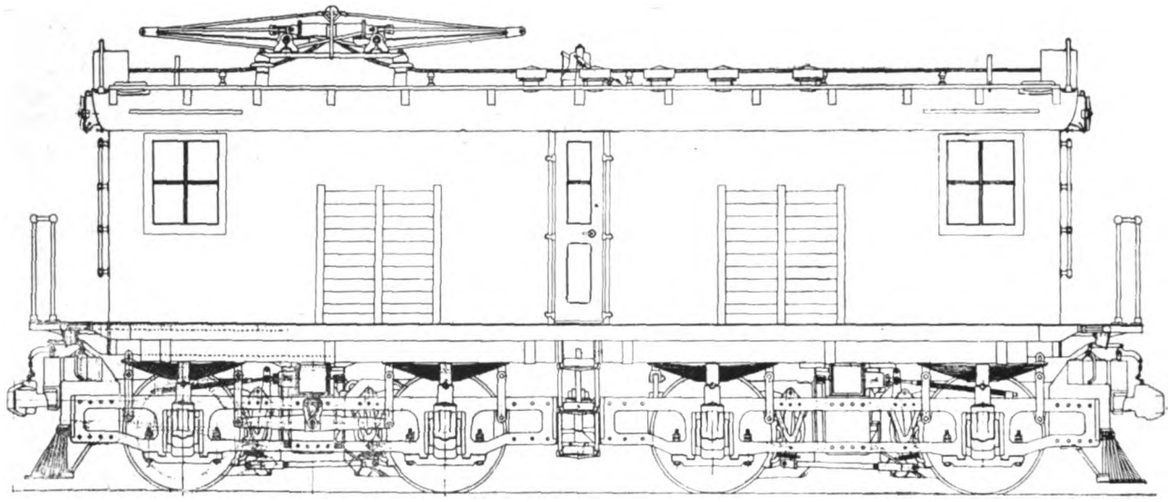
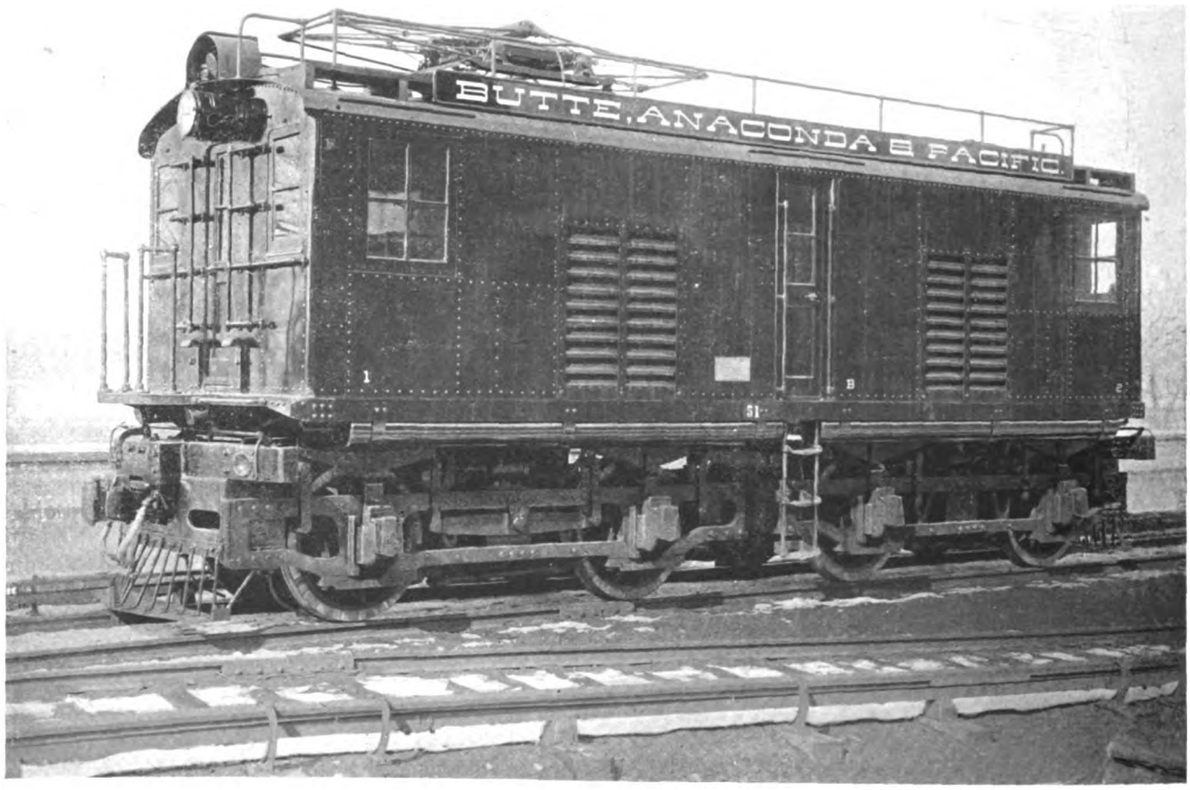
For operating the control equipment and air compressor and for lighting the locomotive and cars, 600-volt current is supplied from the 2,400/600-volt dynamotor installed on each locomotive. One of these windings is designed for 1,800 volts and the other for 600 volts, the two commutators being connected in series across the 2,400-volt circuit. The load current is taken from the 600-volt commutator.

The mechanical load furnished by the direct-connected blower supplies sufficient current in the series field windings to provide for the necessary excitation, so that no shunt windings are required. The blower which supplies ventilating air to the motors consists of a multivane fan mounted on an extension of the dynamotor shaft. It has a capacity of 7,200 cubic ft. per minute at 4 in. pressure.

The principal data and dimensions applying to the locomotives are the following :



Side Elevation Direct-Current 2,400-Volt Electric Locomotive.



2,400-Volt Direct-Current Locomotive.

Length inside of knuckles	37 ft. 4 in.
Length over cab	31 ft.
Height over cab	12 ft. 10 in.
Height with trolley down	15 ft. 6 in.
Width over all	10 ft.
Total wheel base	26 ft.
Rigid wheel base	8 ft. 8 in.
Track gauge	4 ft. 8½ in.
Total weight	160,000 lb.
Weight per axle	40,000 lb.

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Wheels, steel tired		46 in.
Journals		6 in. × 13 in.
Gears, forged rims	goods locomotives	87 teeth.
	passenger locomotives	80 ,,
Pinions, forged	goods locomotives	18 ,,
	passenger locomotives	25 ,,
Tractive effort at 30 per cent. coefficient		48,000 lb.
Tractive effort at one hour rating		30,000 lb.
Tractive effort at continuous rating		25,000 lb.

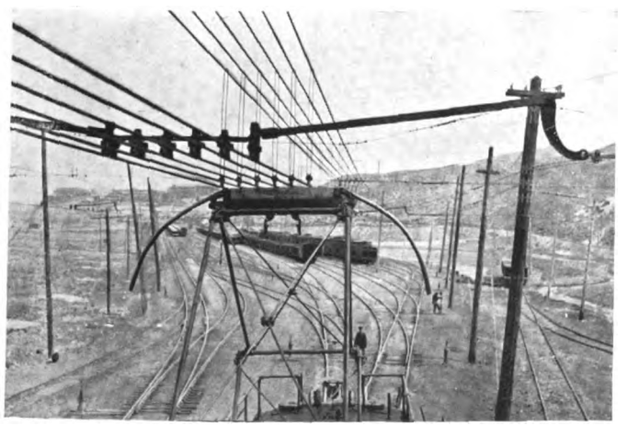
The locomotives have been maintained by the regular shop force with the assistance of one man experienced in electrical apparatus.

Lighting and Heating the Passenger Coaches.

Catenary Line Hanger.

Standard 600-volt lighting fixtures will be used on the cars, and each passenger and baggage coach will be wired for five groups of five lamps in series. The lights in each car will be controlled by a suitable master switch and fuse with snap switches in the individual circuits. Thirty-six watt railway type Mazda lamps are used, giving about 26 c.p. at 110 volts per lamp. Lighting current will be taken from a 600 volt train line bus, which is connected to the dynamotor on the locomotives.

All of the passenger and baggage cars now used between Butte and Anaconda will be heated as well as lighted by electricity as soon as the equipment can be installed. The cars will be heated from a single heating unit installed underneath the car floor, and supplied from a 2,400-volt bus-bar connected directly to the 2,400-volt bus on the locomotive. This unit will have a maximum capacity of 25 KW. and will be used to heat the air, which is distributed to different parts of the car by means of a small motor-driven blower. Cool air will be drawn into the insulated case enclosing the heating units from some point on the roof of the car. After passing over the heating coils the air will be carried through ducts under the floor of the car to radiators placed between alternate seats. The blower has a capacity of from 500 to 1,000 cubic

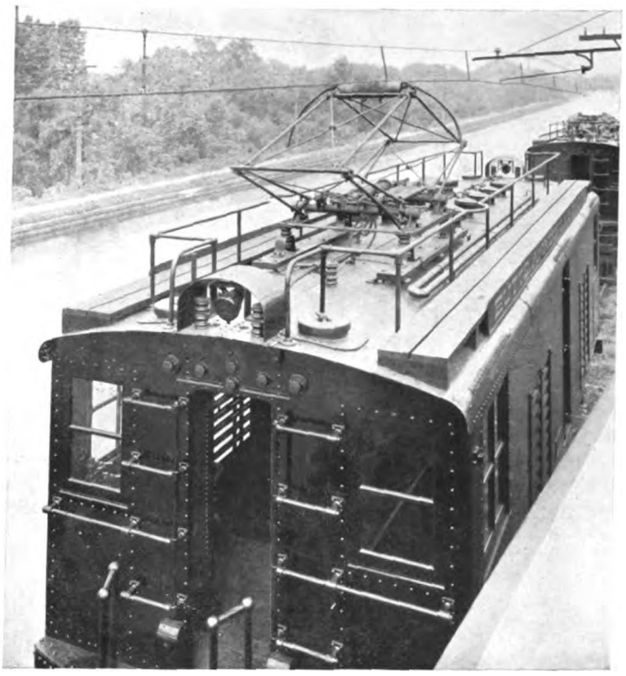


Pantagraph in Contact with Six Wires.

feet of air per minute, and the motor is connected in series with the heating units.

In order to increase the range of the heating equipment to meet the requirements of varying temperatures, provision is made for connecting the cells to give a total consumption of 10, 15, 17·5, or 25 KW. The temperature of the car is regulated at all times by a thermostat.

We are indebted to the British Thomson-Houston Company, the allies of the General Electric Company,



2,400-Volt Locomotive, Showing Pantagraph and Roof Gear.

of New York, by whom the line was equipped, for this description of one of the most notable of examples of steam railway electrification in the United States.

IMPROVEMENTS ON LONDON UNDERGROUND RAILWAYS.

Thirty-five extra trains each way were added to the District Railway's Mansion House to Wimbledon service early in March, by the opening of a flying junction at Earl's Court. This not only eliminates the frequent delays that occurred on the old type of junction, but also has increased the permanent way accommodation on that section of the railway from 84 to 100 trains per hour.

Since the opening, on March 2, of the escalators at Charing Cross (Embankment) Station, connecting the District and the Bakerloo Railways, they have been used daily by over 10,000 passengers. Previous to the installation of the escalators, 8,000 passengers represented an average normal day's traffic at the latter station. Each stairway is capable of carrying 11,000 passengers per hour. Using the long subway previously in use, a passenger took 3 min. 15 sec. to walk from the north-bound Bakerloo Station to the west-bound District platform; whereas, by using the escalators, the time is only 1¾ min.

Under the old method of ventilating the tunnels of the Underground Railways, the air was withdrawn by means of an exhaust fan. By the device now being installed at the Edgware Road, Euston, and at the new Embankment Station, unlimited supplies of air will be pumped into the tunnels throughout the day and night. Ordinary air is passed through a washing screen, which extracts all impurities, the requisite humidity is next imparted, and by the system of the Ozonaire Company a proportion of ozone added. The revivified air is then sent into the stations at the rate of 25,000 cubic ft. per minute.

Bristol Council and Tramway Purchase.—Only four members of the Bristol Corporation on March 31 voted for a motion by Councillor Witty that the Tramways Option Committee be instructed to submit to the Council the joint report of Messrs. J. B. Hamilton and Snell with reference to the Bristol tramway undertaking. Alderman Pearson, chairman of the committee, stated that that body were unanimously of opinion that it was not at present desirable to give the report to the Council. They were going before Parliament shortly, and it would be an advantage to him if he knew precisely what the nature of the Tramways Company's case was. It would be of great value to the Tramways Company to know precisely what the Corporation case was. He was satisfied that it would be wise to purchase the tramways. Some of the committee had not satisfied themselves in favour of purchase; they required more information.

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IMPROVEMENTS IN THE BRILL 39-E TRUCK.

Two notable improvements have recently been made in the Brill single-motor truck No. 39-E (Fig. 1), which are of considerable interest to tramway managers, rolling stock superintendents, and all acquainted with the mechanical features of truck construction.

The improvements consist of (1) an automatic graduated spring system for light and heavy loads, and (2) the use of a brake beam for the pony-wheel brake shoes. Up to the present there has been no effective means of providing a soft spring arrangement on a motor truck for carrying a car body with a light load, and, as a large part of the time the car is running light, the spring system was not suited to the load, there having been no provision for absorbing all vibrations—only the principal shocks. This has heretofore been accepted as a necessary evil. It has been more or less common to have a car running light, but more noisy than when fully loaded, and, of course, vibration has been uncomfortable to passengers and bad for the entire equipment. It is the small incessant vibrations that are more harmful than the occasional heavy jolts. Various endeavours have been made to overcome this difficulty, but up to the present without any really practical success.

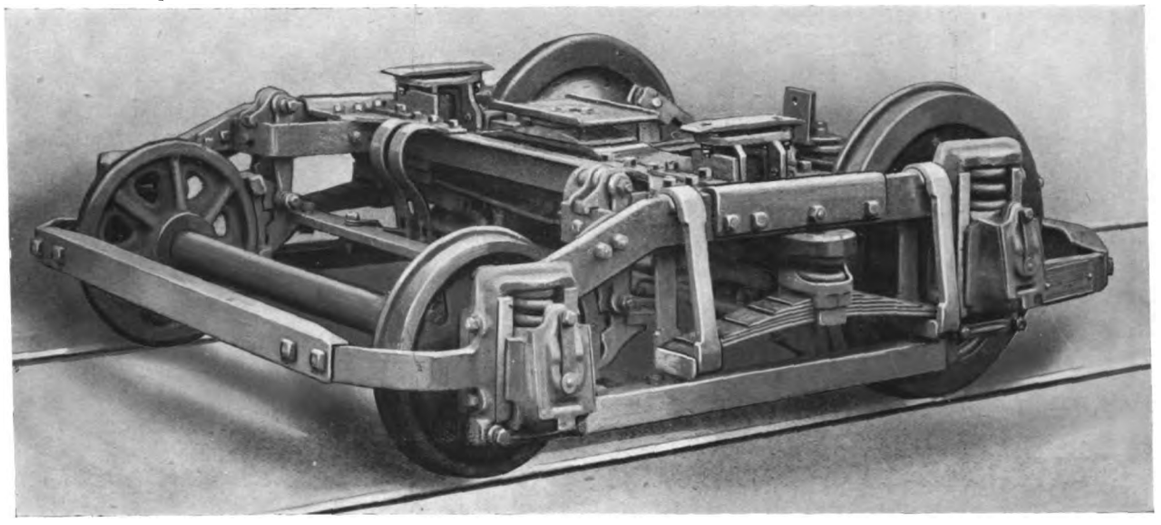

Fig. 1.—39-E Truck.

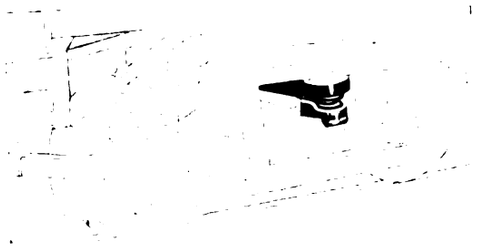

Fig. 2.—Coil Spring on Top of Semi-Elliptic.

The above difficulties have now been met, however, by an ingenious device recently adopted as an important part of the spring system on the Brill No. 39-E single-motor truck. It consists of a coil spring interposed between the bolster and the leaf spring (Fig. 2), thus providing a soft-acting spring between the bolster and the semi-elliptic, which latter, being a frictional spring, is naturally not suited for absorbing the smaller vibrations.

The result is a remarkably easy-riding truck under a light load or with the car body empty.

By casting the end of the bolster to form a cap for the coil spring, and by having a seat casting arranged to come into contact with the bolster when the car body is half-full—this by allowing $\frac{1}{2}$ in. between bolster cap and the seat casting—the semi-elliptic is brought into play for the heavier load. The coil springs are of the nested type with an outside diameter of 6 in.

To provide for a splay of the swing-links, which carry the semi-elliptic on the side bars, a link is provided between the bolster and the coil spring seat casting (Fig. 3). Formerly, the semi-elliptics were given a twist whenever the bolster swung over, which, of course, made the ends of the springs wear into the castings at the bottom of the swing-links. Now, as the links which connect the coil spring seat casting with the bolster are pivoted at each end, the coil springs take the twist off the semi-elliptics. This is a Brill patented device.

In regard to the pony-wheel brake beam, there has long been an endeavour to devise a thoroughly satisfactory arrangement for the pony wheels on a single motor truck. The pony wheels, being of a smaller diameter, with the brake shoes carried low, made it quite a problem to carry a brake beam which would not spring with the force of the pull rod. After a series of experiments, a method of brake beam attachment and operation was produced in which the beam is in a direct line with the force (Fig. 4). A differential lever system for exerting a proportionate pressure on each pair of wheels, according to the load which each carries, has been worked out in a very simple and effectual manner

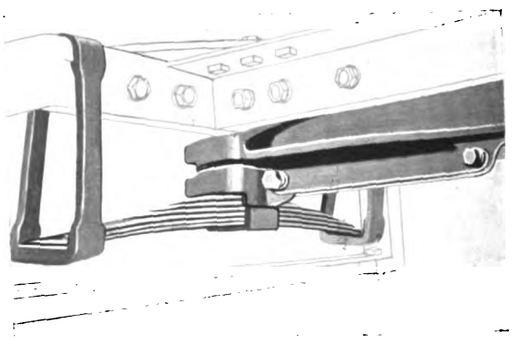

Fig. 3.—Pivoted Links.

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The connection between the two brake beams, including the adjusting feature, is practically the same as in the other Brill trucks. The centre-pull lever is the same as formerly. Therefore, the Brill single-motor truck now has a brake system which under practically any conditions will keep all four brake shoes in perfect alignment. This improvement is also covered by patents.

The improvements described above are considered by those who are operating trucks having these devices as being amongst the most important advances made in truck construction, as applied to one of the most largely used electric trucks, viz., the Brill No. 39-E. We are informed that nearly 10,000 are in operation, indicating its popularity with tramway owners.

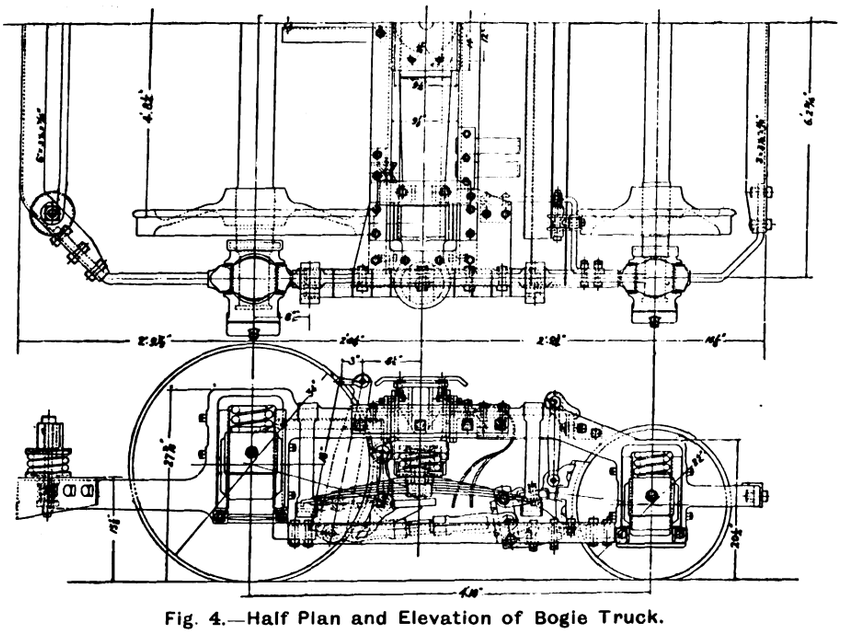

Fig. 4.—Half Plan and Elevation of Bogie Truck.

THE ELECTRIFICATION OF MELBOURNE RAILWAYS.

Mr. W. Fitzpatrick, chairman of the Victorian Railway Commissioners, has published a report on the tour recently undertaken by himself and other railway officers for the purpose of inspecting automatic signalling and electric train working. The inspection was made in view of the completion next year of part of the conversion of the Melbourne suburban railways to electric traction. Mr. Fitzpatrick is much impressed with the automatic signalling in use on electric railways, the system also including train stops which come into operation automatically and cause the brakes to be applied and the power to be cut off simultaneously if a signal is passed at "danger."

"While in New York we had," says Mr. Fitzpatrick, "an opportunity of seeing the extremely heavy inwards business traffic in the morning, and the return traffic in the late afternoon. One sees crowded suburban trains everywhere in England and on the Continent also, and it is in the nature of suburban traffic that this should be unavoidable owing to various causes, and in London especially I have seen trains crowded to a marked degree. It was, however, a revelation to see on the Manhattan Elevated and the Interborough Rapid Transit lines the perfection to which crowding can be carried, and the palm in this respect certainly lies with the Interborough Rapid Transit Company. Their cars seat 52, but having a wide space between the seats specially provided for standing passengers, and numerous straps hanging from the roof for passengers to steady themselves by, they find standing room for 120 more, making 172 in all, which number I was informed was occasionally exceeded. I was told that it is the standing passengers, or 'strap hangers,' as they are termed, who are looked to for the dividends. These facts are not urged in extenuation of our own shortcomings—which it must be admitted are often the cause of public annoyance—but are merely stated to show that in this respect we sin in very good company."

Mr. Fitzpatrick formed the opinion that electric traction for railways, and particularly suburban railways, is becoming increasingly popular, and he was also glad to find that, as anticipated, the system of electric traction which has been adopted for the Melbourne suburban railways, viz., direct current with overhead conductors carrying power at 1,500 volts, is well up-to-date, and that there is no reason to fear that it will be superseded by any better system for a long time to come.

Incidental to the adoption of electric traction he mentions that it is necessary for the Pintsch gas equipment now in the suburban cars to be replaced by electric light, and the wiring and provision of lamps, which do not form portion of the contract for coach equipments held by the General Electric Company, will require to be carried out by the Commissioners. After consultation with Mr. Merz, the consulting engineer, he has deferred arriving at a definite determination as to the style of electric lighting which should be adopted until a series of experiments have been conducted.

The report adds: "I have not anywhere seen a better system of steam suburban lines than that in Melbourne. Our new type of suburban car is as good as the best on electric lines; our bogie compartment cars are better than most of those run on steam suburban lines; and, on the whole, our suburban trains are, in the matter of speed, comfort, and time-keeping, amongst the very best I have seen, and only in the matter of speed are they inferior to the best electric suburban lines, while they are superior even in that respect to many such lines. While there is a considerable variety of suburban cars in use in England, on the Continent, and in America, the best electric railways generally use saloon cars (the internal arrangements of which vary) with either end doors or both end and centre doors, with an attendant to each two cars to open and shut the doors and assist at wayside stations, and on such lines there is communication throughout the train from one car to another. Some lines have only one class, others have two classes, and a few three classes."

Mr. Fitzpatrick refers to the educational effect of sending officers to the Old World and America occasionally, and he acknowledges the great courtesy extended to his party by the various officials consulted during the tour, especially in connection with the electric lines of London and New York. Mr. T. B. Molomby, his passenger superintendent, and Mr. E. B. Jones, the secretary, are on their way to Europe and America in order to study the working of electric tramways.

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HIGH-TENSION DIRECT-CURRENT TRACTION AT BURY.

The accompanying illustration shows one of the cars now running on the Lancashire and Yorkshire Railway's electrified line between Bury and Holcombe Brook, a distance of three miles. It is now about two years ago that the announcement was made that the railway company had entered into an arrangement with Messrs. Dick, Kerr and Company for the electrification of this line on the high-tension direct-current system, the details of which had been carefully worked out by the firm, their experiments having been spread over a long period. The Bury and Holcombe Brook scheme was entered into for the purpose of further test on an actual railway supplying public service. There is no other example of high-tension direct-current traction in this country, and at the time the work was undertaken there were very few examples of it in any part of the world. Theoretically, and on the face of it, the system presented all the advantages of direct-current traction, together with the economy in transmission at high tension usually associated with alternating current, while it escaped many of the objections associated with single-phase and three-phase traction. These anticipations have since been quite fulfilled by experience both in America and on the Bury line. We also have the enormous installation on the high-tension direct-current system now on order for the Melbourne suburban railways. In our present issue will be found an illustrated description of the electric equipment of the Butte, Anaconda, and Pacific Railway, a line for the most part devoted to mineral traffic. It is equipped on the direct-current system, using a working pressure of 2,400 volts, and is the first mineral railway in the world to be so worked.

Messrs. Dick, Kerr and Company's installation at Bury, though applied to a much shorter railway, is an example of the use of a much higher voltage, the pressure employed being 3,500 volts. It is almost needless to say that such a pressure is not necessary in order to obtain economical transmission over such a short length of railway on which the traffic is not very heavy.

High-Tension Direct-Current Car on Bury to Holcombe Brook Railway.

It is used purely for experimental and demonstration purposes, with the object of extending the system in the future. Hence the Bury to Holcombe Brook line is an independent unit. The electrification of the Lancashire and Yorkshire Company's line from Manchester to Bury, which is now in progress, is being carried out on the third-rail system, and is thus quite distinct.

The Bury to Holcombe Brook section has now been under electrical operation for nearly a year, and though details have not yet been published, it is known to be working quite satisfactorily. In the illustration a car is seen pulled up at a halt where there is no station, and at such a point the steps shown are let down to

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enable passengers to board or leave the car. It will be seen that the overhead construction (which takes the place of the third-rail conductor used for ordinary tension traction on railways) is of a very simple catenary type, and that side-pole bracket suspension is used. The car has two pantagraph current collectors. There is considerable reason for hoping that this little demonstration line may be the forerunner of others on the same system. Experience with single-phase high-tension traction has not on the whole been so encouraging as to prevent railway engineers from looking out for something better.

MOTOR CARRIAGES FOR LOCAL RAILWAY TRAFFIC.

(From a Correspondent.)

Pending the electrification of the local transit lines of Stockholm and Gothenburg, the Swedish State Railways have made investigations of and published a report on the various methods for local traffic: accumulators, electric fast service, and steam service.

The Prussian-Hessian State Railways, it is mentioned, have gone in for a number of motor carriages, intended for the local trains. These motor carriages have been either accumulator-electric or benzol-electric. The cost of accumulator-electric motor carriages in Sweden has been calculated at Kr. 52.95 (about £2 19s. 4d.) per 100 train-kilometres for one double carriage with accommodation for 100 passengers, and Kr. 97.90 (about £5 9s. 0d.) per 100 train-kilometres for two coupled double carriages, with accommodation for 200 passengers. These figures refer to accumulator carriages, with ordinary lead accumulators of the type used on the Prussian-Hessian State Railways. If in their place the Swedish Jungner accumulators should be used for the motor carriages, the cost for a double carriage for 100 kilometres per charge would be Kr. 72 (about £4), against Kr. 77 (about £4 5s. 6d.) for lead accumulators. This may look somewhat odd, considering that the Jungner accumulators are more expensive than the lead accumulators, but it is explained by their being so much lighter; therefore the energy consumption becomes less, and the battery in consequence can be reduced in size.

From this it would appear that in Sweden there is no occasion to commence experiments with lead-accumulator carriages, provided the Jungner accumulators did not require more maintenance than calculated. The Jungner Company, however, are willing to take upon themselves the maintenance for a fixed remuneration.

The question of cost as regards the Edison accumulators has also been gone into with a view to their being used for accumulator-electric carriages. The result is that the difference in cost between the Jungner and the Edison accumulators in the matter of working cost is very slight. A material drawback as regards the Edison accumulators at present is this, that the factory where they are made is so far away that no assistance can be reckoned upon from this quarter, should such be wanted.

The working cost of benzol-electric motor carriages as motive power for trains as those mentioned above, with accommodation for 100 passengers, would be Kr. 40 (£2 4s. 6d.) per 100 train-kilometres. For a corresponding Diesel electric train of the type which has been tested on the Swedish State Railways, the working cost would be only Kr. 35 (or £1 19s. 0d.) per 100 train-kilometres.

A Swedish electric firm has constructed a Diesel electric carriage which the State Railways intend to use for local trains. This carriage has in the one end a machine compartment; next to this a compartment for luggage, then a section for passengers with 39 seats, a corridor, through which the passengers get in and out, and a closed compartment for the driver. It is constructed for a maximum speed of 60 kilometres per hour, and intended to pull two trail cars weighing an aggregate of 30 tons without passengers.

The machinery consists of a 6-cylinder Diesel motor of 75 effective H.P. at 700 revolutions, a continuous-current generator of 50 KW., 440 volts, coupled to the former, and two railway motors of 30 H.P. each. The motors are ordinary railway motors, and connected in the usual manner to the carriage axles, to which the power is transmitted by simple toothed gear. Lighting and manœuvring current is obtained from a Jungner accumulator battery of 28 elements, and 200 ampere-hours' capacity.

During the winter the carriage is heated by means of the water from the Diesel motor, which passes through heating elements placed in the carriage. Only one man is required for the working of this carriage, and in order to ensure safety there are several appliances. Thus, the press-button on the controlling manœuvring handle must be kept pressed down whilst driving. Should anything happen to the driver—a fainting fit, for instance—he lets go the button, whereby the main current-interrupter at once will cut out the motor current. Should the driver through inattention drive past a stop signal, there is an appliance which automatically interrupts the motor current, and puts on the air brake. The same effect is produced through the emergency brake in the interior of the carriage.

As fuel, raw oil is used, and the cost of fuel is calculated to amount to only 30 to 40 per cent. of the corresponding cost of a benzine-electric or steam motor carriage of same capacity. The above refers to local connecting trains, that is, trains for which a relatively low average speed is fully satisfactory.

For local trains in the ordinary sense of the word, when the trains have to be started quickly and stop often, matters are different, and here ordinary electric working is preferable, especially when, as in Sweden, electric current can be procured at an advantageous price from the State Alfkarleby hydro-electric power-station.

The cost per 100 train-kilometres for trains with accommodation for 200 passengers according to the State Railway's calculations comes out as follows: For steam trains Kr. 76.94 (about £4 5s. 6d.); for lead accumulators with low average speed, Kr. 97.90 (about £5 9s. 0d.), and for high average speed very much more; for Jungner accumulators with low average speed, Kr. 82.20 (about £4 11s. 4d.); and for high average speed, Kr. 156 (or about £8 13s. 4d.). For electric working with contact lines, as proposed by the board, and subject to certain time-table regulations, the total cost for local trains, Stockholm-Märsta, would be Kr. 62.29 (about £3 9s. 3d.) per 100 train-kilometres, and for Gothenburg-Alingsas, Kr. 60.68 (or about £3 7s. 5d.). With the present number of trains steam power is cheapest, and with a couple more trains daily on the former, and one on the latter line, the cost will be the same. Adoption of electric traction on the Stockholm-Märsta will mean an income to the State Water Power Board of rather more than £5,000 per annum.

Mexborough Tramways Company's Railless Scheme.—Steps are being taken to carry out the company's powers for installing a railless trolley system to Manvers Main and Conisborough.

Magnetic Brakes on Open Top Cars.—In order to minimise the liability to accidents Mr. Pilcher, manager of the Aberdeen tramways, has obtained sanction to equip the eight largest open top cars with magnetic brakes. The British Thomson-Houston Company's brake is to be fitted, at a cost of £36 per car, in time for the summer traffic.

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THE
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Tramway and Subway Proposals for Manchester.

Much of interest to all concerned with the passenger transportation problem in cities will be found in the report by Mr. J. M. McElroy, general manager of Manchester Corporation Tramways, a long abstract of which will be found in other pages of this issue. It is abundantly evident that Mr. McElroy made good use of his opportunities to examine the local transit facilities in many cities in Europe and America, and he has returned with a mind richly stored with information (of which only a part can, of course, be embodied in a report) that will be of the greatest service to the Manchester Corporation. While the application and the recommendations of the report are for Manchester, the bulk of it is occupied with matter which should be of much value to all tramway and local railway authorities in this country. The information is, of course, brought down to date, and in such a progressive subject as the improvement of local passenger transportation this is of the utmost importance. Moreover, the facts are ranged in a comprehensive way so that they cannot fail to make their full appeal to that large number of town councillors in the country who are obliged to concern themselves in the subject, and who ought to lose no opportunity of making themselves expert. People who are familiar with the traffic condition of the busiest streets in London may suppose that Manchester has not much to complain about. But the Manchester congestion is rapidly growing, and the true wisdom of the Corporation is shown in the fact that they are taking time by the forelock, and that they realise that it is their duty never to allow Manchester street traffic in the future to come anywhere near the state of perennial blockade which prevails in London. Ranging over all that has been done and is being done in many of the principal cities of the world to deal with the passenger traffic, Mr. McElroy comes to the conclusion that as an initial step the best thing is to open up new arterial tramway routes, involving the construction of some new streets, and to provide several tramway terminals near the centre of the city. In his view, the time has not yet come for the construction of subways or underground railways, the cost of which will only be warranted when there is sufficient traffic to require the running of a very frequent service of trains instead of single cars. This fact is amply borne out by the experience of London. As to his preference for shallow subways to deep-level tube railways, the choice must depend on local circumstances, including the nature of the subsoil and the value of property along the route. The London underground railways could never have been constructed as shallow subways except at ruinous cost, and the deep sub-soil of London is eminently suitable for tunnelling. We are glad to observe that Mr. McElroy insists on the necessity for tramways and underground railways being designed so as to supplement one another, and for both being under one control. Co-ordination and efficiency should be the watchwords. It is the want of this design and this unified control which has caused so much trouble in London. Whether such a unified scheme should be in the hands of a municipality or of a company working under municipal control is a question for the locality concerned. The great thing is to have a unified scheme.

Business Principles in Leeds.

Out of evil cometh good. Not long ago all the departments of Leeds Corporation, except the tramways, which employ labour were more or less paralysed by a strike in which syndicalist principles threatened the whole community. By firm action on the part of the Corporation, and

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particularly of a special committee of Aldermen appointed for the purpose, the strike was suppressed, and the danger to the citizens of being deprived of absolutely necessary services was averted. But the special committee have earned further gratitude by the proposals which they brought forward, and which were adopted by the Corporation on March 27. Under these there is little chance for any future attempt at a municipal strike in Leeds, and efficiency and economy will be much developed. A General Purposes Committee comes into existence, and to its members are delegated full powers to deal with the appointment, control, dismissal, wages, hours, and conditions of labour of all Leeds municipal workmen. Moreover, Mr. J. B. Hamilton, general manager of the tramways, is appointed executive officer of the new committee. His organising and administrative powers may be trusted to bring about an entirely new situation, and it may be expected that we shall soon see the Leeds municipal departments run on efficient business principles and with an economy hitherto unknown. The strike showed, among other things, that too many men were employed in the gas and other departments, and that new plant and appliances would produce much economy. The municipal employees will have more regular work; for when any of them are not for the time being required in one department, they will be transferred to any other which needs assistance. An arrangement somewhat analogous to this is being tried in some American towns, where a committee of experts has displaced the municipal Council; but Leeds is the first place in this country to organise the various departments of a municipality into a co-ordinated whole, and to manage its public services in accordance with a sound business policy. The experiment at Leeds will probably be the forerunner of similar arrangements in many other towns, and the Corporation is to be congratulated on the initiation of a movement which will, we believe, be of great service in promoting the well-being of our municipalities.

London Police and Trail Cars.

In any steps that are taken for the formation of a Traffic Board for London, the work of the Metropolitan Police, so far as it concerns the licensing and control of public-service vehicles, ought to be transferred to the new authority. Whether the Board will ever be constituted is a speculative question. As yet there are no indications that the Government have awakened to the serious state of affairs disclosed in the report of the Select Committee last year. Three or four departments continue to have a finger in the London traffic pie. A remarkable circumstance just now serves to emphasise the need for reconstituting the public-service vehicle department, and placing it under practical men who can bring engineering knowledge to the discharge of their duties, and also an acquaintance with traffic conditions gained by observation in the great provincial centres of population and the busiest cities of other countries. The need for this reform was indicated in July, 1912, by the nature of the evidence given by the two police witnesses, who appeared before a Committee of the House of Commons to oppose the County Council's application for authority to run trail cars. One of them had no better grounds of opposition than those of "obstruction to traffic," "danger to the public," and the "progressive rate of accidents." A considerable number of trail cars has been running for the best part of a year now, but there has been no increase in the foregoing undesirable conditions so far as the same may be attributed to tramcars. The second police witness on that occasion admitted that he had never seen a trail car in operation. That there are none so blind as those who will not use their eyes is evidenced by Scotland Yard having sent Chief Constable Craik, the new head of the department, to give evidence on April 2 against the London United Tramways Company's application for powers to run trail cars. These cars pass the witness's office during the rush hours, and he cannot have taken the trouble to make himself acquainted with the results of their working, or he would not have expressed the view that trail cars would cause more obstruction than single cars. He has only to step down to the Elephant and Castle junction to see that, amid the apparent chaos of traffic, the units which cause the least obstruction are the tramcar and its trailer. This fact is fully appreciated by the Board of Trade, as was shown by their action some years ago in refusing to pay heed to the complaint of an association of horse owners in a provincial

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city that the cars did not preserve a distance of 10 yards apart in crossing a busy centre. After hearing the evidence of Mr. A. L. C. Fell as to the economical and safe working of trail cars in London, coupled with the announcement that 150 more are on order, the Committee did not hesitate to grant the application, subject to the supervision of the Board of Trade, and to the consent of those local authorities with whom agreements had been made in former years not to operate trail cars.

LONDON GENERAL OMNIBUS COMPANY, LIMITED, AND METROPOLITAN TRAFFIC.

RESULTS OF THE YEAR'S OPERATIONS FOR 1913.

BY A. J. LAWSON, M.INST.C.E.

In the last monthly issue of THE TRAMWAY AND RAILWAY WORLD was given the very interesting statement, at the general meeting of shareholders, of the chairman of the London General Omnibus Company, that, whereas the fatalities per motor omnibus in 1912 amounted to one for every 443,057 miles run, in 1913 they amounted to only one for every 665,402 'bus-miles—and quite enough too; in the opinion of most people far too many. But if we are to adopt this information let us see how far it agrees with data from other sources.

From an official report recently issued, it appears that the number of deaths caused by motor omnibuses in 1913 was 180, while the report for 1912 gave the fatalities caused by the same type of vehicle in that year as 182. The Omnibus Company is, therefore, to be congratulated that its vehicles caused *two* fewer deaths last year than in the previous year, and this upon the increased 'bus-mileage for every death caused by its operations. Let the reader, however, imagine 180 deaths a year as the standard by which to measure the London General's 'bus-mileage: 180 fatalities × 665,402 miles = 119,772,360 'bus-miles.

Then we had at the Institution of Civil Engineers, within the past two weeks, in the discussions of Mr. Gribbles' paper on "The Trolley 'Bus" and Mr. Clarkson's paper on "Steam Cars," a remarkable confirmation by Mr. Worby Beaumont of the London General Omnibus Company's figures given above in his statement that in one month in 1913 the London 'buses had run 9¾ million miles, and had carried 65 million passengers in that time, and that the carrying power of the motor 'bus to the tramcar was as 1 to 1·6 (presumably taking the tramway figures of 1912 for comparison, for those of 1913 are not yet available). Taking all London, I find these last figures to be almost exactly right: for the London County Council cars, however, the proportion is as 1 to 1·683, but for the East London Tramways far less favourable to the omnibus, the 'bus and tramcar ratios there being as 1 to 1·934: the poor average for all London tramcars being due to the low averages of 6·403 passengers per car-mile on the London United Electric Tramways, 7·508 passengers on the South Metropolitan Tramways, and 7·969 passengers per car-mile on the Metropolitan Electric Tramways Company's lines; compared with which the East Ham average of 12·553 passengers per car-mile is indeed high, though the latter's average fare of ·829d. per passenger is far below the general average, and nearly one-third of a penny per passenger under the 'bus fare.

It is, however, only with the results of the operations of the London General Omnibus Company for the past year that it is proposed to deal on the data already mentioned and on the figures of the balance sheet and accounts as already given in THE TRAMWAY AND RAILWAY WORLD in the issue of March 9, and these appear to be as follow:

London General Omnibus Company, Limited, 1913.

'Bus-miles run	119,772,360
Passengers carried ...	676,328,145
Passengers per 'bus-mile	5,647
Average fare per passenger	1·156d.

Expenses.	Amount.	Per 'Bus in Use.	Per 'Bus-Mile.	Per Passenger.
	£	£	d.	d.
Drivers' and conductors' wages	828,213	264·8	1·660	·294
Other traffic expenses	719,489	229·9	1·442	·255
Rolling stock, maintenance, tires, etc.	1,084,220	346·5	2·173	·385
Buildings and plant	17,998	5·7	·036	·006
General expenses	124,904	39·9	·250	·044
Working costs .. £	2,774,824	886·8	5·561	·984
Depreciation of leases and plant	16,613	5·3	·033	·006
Reserve for renewals	175,000	55·9	·351	·062
Interest and redemption of debentures and income bonds	105,446	33·7	·211	·037
Total costs .. .. £	3,071,883	981·7	6·155	1·089
Total revenue .. £	3,258,197	1,041·3	6·529	1·156
Net revenue .. £	186,314	59·6	·373	·067

The above figures *per bus* are based upon the average number in use throughout the year having been 3,129 as deduced from the numbers licensed at the end of each quarter according to the figures kindly supplied to the writer by the Commissioner of Police of the Metropolis, as were also the figures for tramcars, which are here given for comparison:

	Motor Omnibuses.	Tramcars.
December 31, 1912 ...	2,908 ...	2,859
March 31, 1913	3,137 ...	2,831
June 30, 1913	3,411 ...	2,779
September 30, 1913 ...	3,429 ...	2,785
December 31, 1913 ...	3,522 ...	2,786

The 'bus-mileage *per vehicle* works out at 38,278 for the whole year, as against 36,804 car-miles for each tramcar owned by the Metropolitan Electric Tramways Company in 1912, so the higher permissible speed in miles per hour of the 'bus, compared with the restricted speed of the tramcar, does not appear to be of such advantage as is generally claimed for the lighter and more "flexible" vehicle.

Moreover, the cost of transport per passenger, even after taking into consideration the whole of the charges for interest and sinking fund payments on the tramways, while leaving out of account the abnormal 18 per cent. dividend on the ordinary stock of the Omnibus Company, is actually lower on the tramways, on which it amounts to 1·057d. per passenger—as against 1·089d. per passenger by 'bus—the 'Bus Company had to pay for road repairs necessitated by its heavy traffic the ·375d. per 'bus-mile which Parliamentary Committees have put upon similar traffic in the provinces, the omnibus total costs would have been increased by ·066d. per passenger making the gross cost figure 1·155d. per 'bus passenger (which is the exact equivalent of the fare received), and both the sum appropriated for dividend and the amount carried forward from last year's profits would have been wholly absorbed in the working costs. Leaving out of reckoning the increase in price of petrol, the continuance of 18 per cent. dividends on the ordinary stock out of earnings on passenger transport, unless the fares are to

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be greatly increased, is a quite improbable occurrence if last year's results as shown in the company's accounts can be accepted as even approximately representing the exact state of affairs.

The *working expenses alone* of the 'buses, which now stand at ·984d. per passenger, would, with the addition of this charge for road maintenance, amount to 1·050d. per passenger, laying aside all consideration of reserve for renewals and depreciation, and interest and redemption of income bonds and debentures.

The London County Council tramways carried in 1913 in round figures, 522,000,000 passengers, at an average fare of 1·011d.; the total receipts from passenger fares amounting to over £2,200,000; but as the final figures will not be available for some time, the costs and net financial results cannot yet be tabulated.

OPENING OF HAMPSTEAD RAILWAY
EXTENSION OF THE LONDON UNDERGROUND SYSTEM.

The opening of the extension of the Charing Cross and Hampstead Railway to the new Embankment terminus took place on Monday, April 6. The necessity for this junction with the District and the Bakerloo lines was obvious from the day that the Hampstead Railway was first opened for traffic in 1907, and the improvement in travelling facilities in the metropolis that arise with the inauguration of the new triple interchange connections at the Charing Cross (Embankment) Station may be regarded as one of the most important developments that have occurred in underground transit during the past few years.

The character of the extension is probably unique, as it is, we believe, the only example of a railway terminus being constructed beneath the bed of a river. A description of the work with numerous drawings was given in these pages as recently as December 13 last, and we do not therefore repeat them here. It may be recalled, however, that on leaving the original terminus at Charing Cross (Strand) the trains of the Hampstead Railway will now run round a single loop line, which, passing underneath the length of Villiers Street, diverges to the left near York Terrace, and making a detour under the Embankment Gardens and the bed of the Thames, returns through a new single-platform station built beneath the District Railway, and thence rejoins the north-bound line near the Strand. The curve under the river extends for 65 yards beyond the Embankment wall, this distance being the limit of dredging operations.

The construction of the loop began in October, 1911, and with the extensive alterations and additions that have been made at the Embankment Station, an expenditure of about £200,000 has been entailed. The task of the engineers was rendered an exceedingly difficult one owing to the tunnel having to be bored largely through water-bearing strata, and also by reason of the many contingencies that arose in connection with the building of the new station beneath the District Railway. The method of tunnelling adopted was the Greathead shield system.

In the straight beneath Villiers Street the tunnel has a diameter of 11 ft. 8¼ in. In the river curve it is 12 ft. 9 in., and there are only from 18 in. to 36 in. of clay between the top of the tunnel and the water bearing ballast of the river bed. In the station the diameter of the tunnel is enlarged to 21 ft. 2½ in. Altogether about 50,000 tons of earth were excavated during the process of boring, and 4,000 tons of iron segments have been placed into position inside the tunnel.

The District Railway Station has been entirely reconstructed. The old building, which dated from 1870, and was quite a familiar landmark in the West End, has been demolished, and in its place one of a more convenient and elaborate design is being erected. The new station, which, like its predecessor, has no upper storey, is built of white Portland stone, with columns flanking the Embankment and Villiers Street entrances. The sign of the Underground, worked in mosaic, and a clock, have been set up on the Villiers Street front, and the booking hall is lighted by a glazed dome crowning the roof. Additional entrances and exits have been made on the north and east, the latter being in a passage through which the public will have a right of way, and which supersedes the older passage, which was formerly on the west. From the booking hall short flights of stairs lead down to the District platforms, adjacent to other short stairways communicating with a circulating area which is the upper landing for four escalators, each of which works in a separate compartment. The two escalators on the west connect with the Bakerloo Railway, and those on the east with the new station of the Hampstead line. As the escalators of the Bakerloo Railway have been working since March 2 last, the travelling public making use of Charing Cross Station have already a good idea of the new arrangements. There are 43 steps between the upper and lower landings of the Hampstead Railway escalators, which have a vertical rise of 28 ft., and move at the rate of 90 ft. per minute. Each escalator is capable of transporting about 11,000 people per hour.

Special arrangements have been made for maintaining a pure atmosphere in the lower levels, a ventilating apparatus having been installed, which is capable of sending a continuous supply of pure air, humidified and charged with a proportion of ozone, into the passages and tunnels below ground at the rate of 60,000 cubic ft. per minute. The motion of passing trains will circulate the fresh air throughout the two stations underground.

The interior of the District Railway Station and the passages and staircases of the two lower stations are lined with glazed tiles, the colour being white with green border and divisions, and from every point of view the new Charing Cross (Embankment) Station may be regarded as one of the most pleasing and commodious of all the Underground stations.

The volume of traffic which will be dealt with at Charing Cross (Embankment) Station will be without parallel anywhere else in the world. During the busier periods of the day a service of no less than 178 trains per hour running north, south, east, and west will be maintained. Of these, 86 will be working over the District lines, 48 on the Bakerloo Railway, and 44 round the loop of the Hampstead Railway. A normal day's service will consist of 2,139 trains, proportioned among the three railways as follow: 1,028 on the District; 540 on the Bakerloo, and 571 on the Hampstead loop. From Charing Cross it will be possible to journey to almost any part of London and its environs. With its lines radiating to all parts of the Metropolis, the new Embankment Station may well be regarded as the centre of the Underground system. It is truly the meeting place of the highways, for above is the main line to the Continent, and alongside is the most ancient of all London's highways, the Thames.

Metropolitan Tramways and Local Taxation.—In view of the recent issue to the House of Commons of the report of the departmental committee on local taxation, Mr. T. B. Goodyer, general manager of Croydon tramways, and hon. secretary of the Metropolitan Association of Tramway Managers, had made representations to the Chancellor of the Exchequer. Mr. Goodyer emphasised the need for "such legislation as will place motor omnibus operators on terms of equality with the municipal tramway authorities in the metropolitan area with regard to the public burdens the latter now have to bear."

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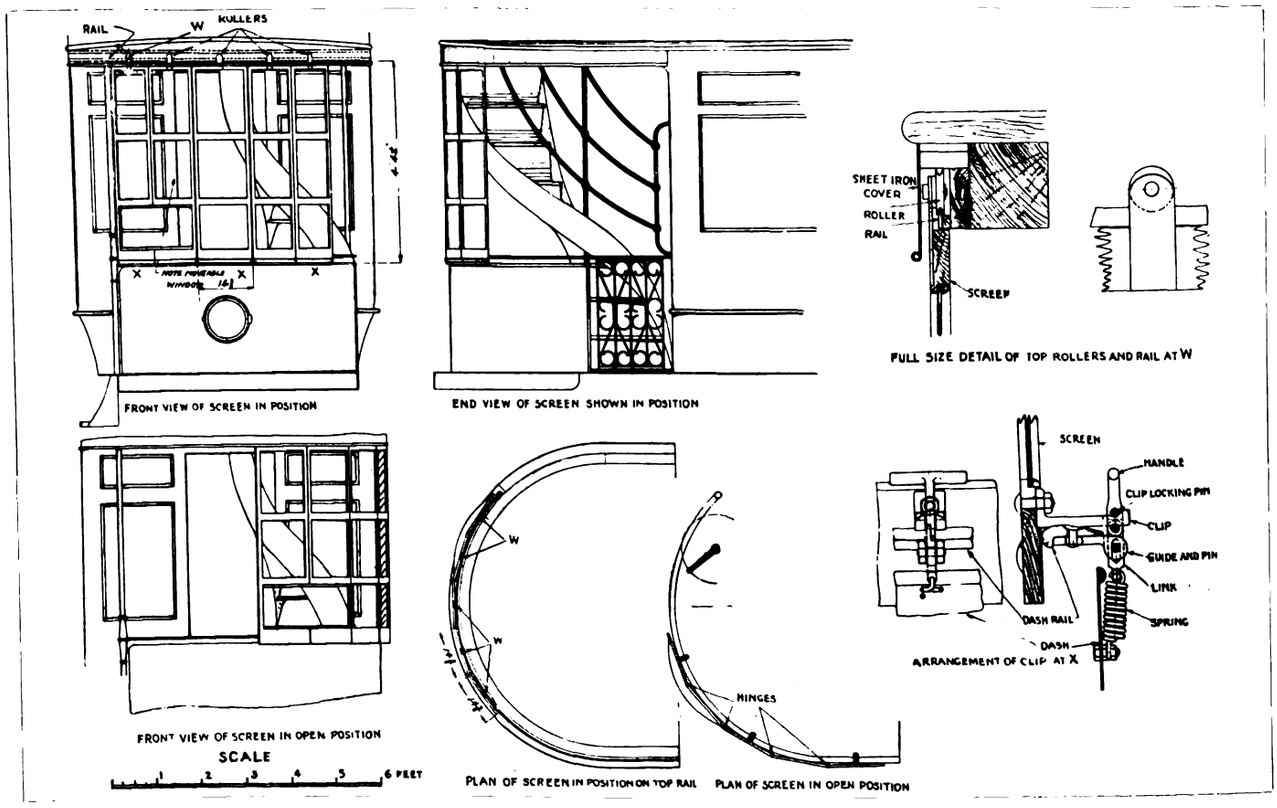
THE LEICESTER WIND SCREEN.

The accompanying illustrations show a type of wind screen which has been installed on one of the cars of the Leicester system, and has been running for some months. The results have been so successful that the 10 new cars now on order for the Corporation will be equipped with this type of screen. It is claimed that it offers manifold advantages over the various folding types of screen that have from time to time been adopted on different tramway systems. Indeed, the screens hitherto in use possessed many defects, and the partial weather protection which they afforded the motorman was accompanied by a more or less obstructed view. The Leicester screen, however, has very successfully overcome this defect, and the device transforms the ordinary car into a convertible vestibule car. The high appreciation with which it has been received by the motormen of Leicester who have worked behind it is practical proof of its effectiveness, while the shelter it affords at the rear end of the car in rough or snowy weather is welcomed by the conductor. It may be constructed for any type of car.

The Leicester Wind Screen.



Details of Leicester Wind Screen.

It forms a vestibule car at a third of the cost, and it gives a handsome appearance to the car. The apparatus has been patented by the inventor, Mr. G. Morris, car shed superintendent, Leicester.

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EDISON BATTERY CARS IN NEW ZEALAND.

The problem of dealing with light traffic in suburban areas and in smaller towns in such a way that a surplus and not a loss will be produced, is being faced in various districts in this country as well as abroad. Here the trackless trolley car and the motor omnibus are at present most in favour, though we have a few examples of petrol or petrol-electric tramcars. The laying of even a single-track tramway involves considerable capital expenditure in proportion to the traffic in sight in many localities where means of communication is much needed, but at the same time the use of rails presents so many advantages that they will be adopted wherever practicable. But granted that a tramway is to be laid, or has already been constructed, the question of what is the most economic motive power where only an infrequent service is required often remains an open one. If the cars require to be run at somewhat long intervals, the gross revenue per mile of track is proportionately small, and the question of the cost of the electric equipment of the route, of laying cables and so forth, for the overhead wire system becomes of some importance. It is then that the claims of petrol or petrol-electric cars come to be examined. The progress which has recently been made in America with the Edison storage battery for traction purposes has, however, brought a new competitor into the field, both for rail and railless traction. This battery does not appear hitherto to have been in use for tramway haulage work outside of the United States, and the following particulars as to its use on the tramways of Gisborne, New Zealand, are of interest.

The municipal authorities of Gisborne, after having carefully considered the claims of motor and trolley 'buses, have finally decided on the adoption of tramcars equipped with Edison accumulators. The following details concerning the working of the system are based upon a report by Mr. S. Jickell, M.I.C.E., engineer to the Palmerston North Borough, and appear in *Progress*.

Gisborne is a thriving seaport town, having a population of about 6,000, and the district, which in the immediate vicinity of the town is flat, is given over chiefly to agricultural pursuits. At present, the length of the permanent way in Gisborne is about one mile, leading through the main street of the town; there is also another short branch leading from the power-house towards the river. The track has a 4 ft. gauge with 63 lb. girder rails supported by transverse sleepers of Australian hardwood, the latter resting on ballast consisting of broken metal 9 in. thick, and shingle 8 in. thick, whilst the surface of the roadway is served with a top dressing of tar and fine gravel. The curves are between 50 ft. and 75 ft. radius. The cost of construction with one car per mile of track, is estimated to be a little more than half of that required for the electric overhead trolley system. At the present time there are in service two cars of the single-truck, closed-body type, fitted with two 10-H.P. Westinghouse motors. Each motor drives one wheel only of each axle, the other being free; the object of this arrangement is to prevent grinding or unnecessary friction on the curves. A controller of the usual tramway type regulates the supply of current from the batteries to the motor.

The battery equipment consists of five A8 type Edison storage cells for lighting purposes, and 100 similar cells connected in series supply current to the motors. Each cell has a capacity of 300 ampere-hours and a voltage of 1·25. The batteries are arranged under the seats, the latter being made detachable to facilitate the inspection of the cells. With a fully charged battery, a car is capable of covering 70 miles, inclusive of all stops and starts, and in the case of these Gisborne vehicles, with the exception of Saturdays, the batteries are not boosted throughout the whole day's service. On Saturdays each battery receives a boost equal to 75 ampere-hours. The batteries, which have been guaranteed for a period of three years, can be fully recharged in five hours. The charging current is obtained from the municipal electric lighting department, and is paid for at the rate of 2d. per unit, which enables the department to make a small profit.

The overall measurement of each car is as follows: Length, 28 ft.; width, 7 ft. 9 in.; height, 12 ft. 3 in.; width between seats (which run lengthways down the car), 3 ft. 4 in.; length of seat, 17 ft. 6 in.; head room, 6 ft. 6 in.; height of car sill from the ground, 3 ft. 2 in. Each vehicle is licensed to carry 26 passengers seated and 20 standing, and the weight, including the batteries, is 14,500 lb. Until extra braking arrangements have been fitted, the Public Works Department have limited the cars to a speed of 10 miles per hour, but they are capable of travelling at 15 miles per hour.

Inclusive of duty (£500), each car complete and ready for service costs £2,250. In order to cover the cost of this tramway installation the ratepayers of Gisborne voted a sum of £25,000, but no actual figures as to the cost of the installation as it stands at present are available, for according to the report of Mr. Jickell, although the greater portion of the money has been spent, the municipality have in hand enough material for the laying of another 5¾ miles of track, and in addition to this they have also established a well-equipped repair shop fitted with the latest machinery, sufficient to enable the Council employees to deal with any repairs likely to be required by the system. The municipal electric light plant, which supplies the battery-charging current, consists of two Diesel 3-cylinder engines, built by Messrs. Merrilees, Bickerton, and Day, each driving a 100-KW. generator. The fuel utilised is N.S.W. shale oil, which is landed in Gisborne at 8d. to 9d. per gallon, and the consumption is 0·87 lb. per unit of current generated. The charge made for lighting current is 8d., and for power 3d. per unit.

The tramway system has only been in operation a short time, but so far no breakdowns or involuntary stops have occurred, and it is stated that although the cars have not been running a sufficient length of time to enable a definite estimate to be formed as to the financial results, the indications are that the running costs and maintenance will, in comparison with other systems, be small, and also the absence of the trolley arm, with its attendant overhead leads and poles, is regarded as a step in the right direction.

MOLESWORTH'S POCKET BOOK.

The present issue of this popular pocket book by Sir Guilford Molesworth and Henry B. Molesworth (966 pp., 4¾ in by 3 in. by ⅞ in., limp cover—C. and A. Spon, Limited, 57, Haymarket, London, W.) is the jubilee edition. Twenty-seven issues have been published, or more than one every two years, since the veteran author first started his Pocket-Book of Engineering Formulæ and Memoranda for civil, mechanical, and later, electrical engineers. At that time, as stated in the preface, Rankin, Unwin, and other leaders did not exist, and in what engineering schools and colleges there were, the tuition was very defective. The number of engineers who have found this little book an indispensable companion and aid compose an army of grateful men, who have to thank Sir Guilford for saving them an amount of time and trouble, the aggregate of which would be astounding. "Throughout the book there is scarcely a formula which cannot be mastered by anyone possessing little more than a mere knowledge of arithmetic"; it is this fact which so greatly enhances the usefulness of the work. The paper is a marvel of thinness, accompanied by an opacity which renders the text and diagrams as clear as any on thick heavy art paper. The electrical supplement takes up 111 pages, and the admirable general index no less than 71; with this and the synopsis of contents, reference is made as easy as possible.

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MANCHESTER AND THE TRANSPORT PROBLEM.

Report by Mr. J. M. McElroy

(General Manager, Manchester Corporation Tramways).

Mr J. M. McElroy, general manager of Manchester Corporation Tramways, has presented to the Special Sub-Committee appointed to consider the passenger transportation problem a very valuable report as the result of his tour of investigation among cities both on the Continent of Europe and in America. The report, as issued, is prefaced by a brief report by the Special Sub-Committee. In this it is stated that the sub-committee set themselves, on their appointment in November, 1911, to investigate the following points:

(1) The probable increase of tramway traffic during the next 20 years.

(2) The provision necessary to diminish the increasing congestion in the central streets, and for facilitating tram traffic, by the following or other means:

(*a*) Widening of existing streets or the construction of new streets.

(*b*) The acquisition of an arterial centre for the marshalling of tram traffic.

(*c*) The construction of sub-ways for tram traffic.

(3) The extent to which the financial resources of the tramway undertaking can be applied to this purpose.

On January 24, 1913, the sub-committee presented an interim report showing the magnitude and importance of the problem, and recommending that the general manager and the permanent way engineer be instructed to visit certain cities in the United Kingdom and abroad, and to study carefully the passenger transportation facilities of those cities, and to present a full report upon the subject for the further guidance of this sub-committee.

This resolution was approved, and on May 7, 1913, the City Council adopted resolutions to the effect that the Tramways Committee should continue their inquiry as to the best means to be adopted for dealing with the rapidly-growing demands of the tramway service. That the Watch Committee should continue their enquiry as to the best methods of regulating and controlling all kinds of traffic in the public thoroughfares, and that the Improvement and Buildings Committee and the Town Planning Committee should consider as to the measures to be adopted for making adequate provision in the future for meeting the rapidly-growing demands of traffic.

The sub-committee suggest that their report (embodying the report of the general manager) should be submitted to the City Council with a recommendation that when the Watch Committee and the Improvement and Town Planning Committees have presented their reports to the Council, the three reports should be considered by a joint conference of representatives of the four committees concerned, with a view to final recommendations being made to the Council dealing with all phases of the matter.

Mr. McElroy's report extends to some 140 octavo pages, and is accompanied by 72 maps and diagrams and a large number of reproductions of photographs. The whole book is very well got up, and is divided into parts and short sub sections each with its appropriate heading. All the headings are given in the contents, so that reference is easy. The manager and the engineer are to be congratulated on the amount of valuable information which they have obtained, as well as on the manner in which they have presented it.

The first part of the report, which is the longest, gives details as to transportation facilities in the cities visited, namely, New York, Philadelphia, Boston, Chicago, Pittsburg, Newark, Montreal, Toronto, Paris, Berlin, Vienna, Hamburg, London, and Glasgow. The various means of transportation are divided into surface-transit facilities and rapid-transit facilities, the former including tramways, motor omnibuses, and trackless trolley cars, and the latter meaning railways on the surface on private right of way, elevated lines, underground lines, and lines in open cuttings.

NEW YORK.

Greater New York, embracing Manhattan Island and the boroughs of Brooklyn, Queens, Richmond, and Bronx, has a population of about 5,000,000, and its area is 324 square miles. Manhattan Island is the most densely populated piece of territory in the world. The crowding of so many huge buildings used for business purposes in so limited an area has created a transportation problem of the most complex kind. The carrying of the vast numbers of people from the outskirts of the city to the "down town" district in the mornings, and back again in the evenings, has created "peak" loads of extraordinary magnitude.

In recent years the regulation, control, and development of the transit facilities of the city have been placed in the hands of a Public Service Commission—a small body of men with special qualifications who are appointed for a term of years, and in whom are vested wide administrative powers for securing the good working and development in the public interests of all those undertakings which are operated by private companies, but which are in the nature of monopolies. The excellent work of this Commission can only be fully appreciated by a visit to the city and a detailed examination of the Commission's methods, and the work it has already done and is still carrying out.

The transit facilities may be summarised as follow:

	Track Miles.
Surface lines (tramways)	1,156
Rapid-transit lines (underground and elevated railways)	296
Total	1,452

The principal lines—both surface lines and rapid-transit lines are operated by two companies, viz., the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company.

The most interesting feature of the existing transportation facilities is the underground railway—the subway as they call it—in Manhattan. This subway is owned by the City authorities, and is leased to the Interborough Company. It is constructed under the streets of the City, and as near the surface as possible. The usual depth of the station platforms from the street levels is about 25 ft., and the approaches are by short flights of steps. The nearness of this subway to the street surface, and its easy accessibility as compared with the deep-level "tubes" in London, at once illustrates the advantages from the passengers' point of view of shallow underground railways as against deep level "tubes." The subway has four tracks—two for express services and two for local services. It was originally built to carry 400,000 passengers per day, but it is now carrying over one million per day, and the traffic is still increasing. The limit of its capacity is now nearly reached. The enormous growth of the passenger traffic of the city from 1900 to 1910 created a pressing demand for increased facilities. During that decade the number of passengers carried grew from 846,353,000 to 1,531,263,000—an increase of nearly 100 per cent.

The Public Service Commissioners prepared a scheme which, as regards breadth of conception and thoroughness in all its details, is unsurpassed. The entire scheme, when completed, will add 333 miles of rapid-transit lines to the existing 296 miles, making a total of 629 track miles. The total cost of the new scheme when completed will be about £68,000,000—a figure about equal to the amount invested in the existing rapid-transit lines in New York.

The new lines are to be operated jointly by the two existing operating companies—the Interborough and the Brooklyn Rapid Transit Companies. The total capital outlay of the new scheme is to be divided, roughly, half-and-half between the city and the two companies. The companies are to get out of the revenue all their operating expenses and 6 per cent. upon their investments, and out of the balance the City is to get the interest on its investment, plus 1 per cent. for sinking fund. The leases to the companies are for a period of 49 years.

The tramway tracks in Manhattan are constructed on the conduit system, the authorities not permitting overhead trolley lines. There is nothing of special note to mention regarding their tramway system beyond stating that they are now for the first time experimenting with a double-deck car, all their exisiting cars being single-deckers. As regards tramways, the conditions of traffic and the strong desire of the inhabitants for *rapid* transit lead one to think that a great deal of attention is not given to tramway development.

The total passengers carried on all the means of transit in New York increased from 50,893,814 in 1800 to 1,687,375,670 in 1912. The competition for patronage has been between the rapid-transit lines and the tramways. Omnibuses have so far found practically no place in New York's transit facilities.

The following ordinance was adopted by the city in April, 1913, and is strictly enforced. Similar ordinances have been adopted by a large number of cities in the United States:

Turning Corners, Overtaking, or Meeting Street Cars.—In turning a corner of meeting or intersecting public highways the person operating, driving, or propelling any vehicle subject to the provisions of section one (1) of this article shall not proceed, nor shall the owner of any such vehicle riding thereon or therein, cause or permit the same to proceed at a rate of speed greater than four (4) miles per hour; and in overtaking or meeting a street passenger car which has stopped for the purpose of receiving or discharging passengers, no such vehicle aforesaid shall pass or approach within eight (8) feet of said car so long as the same is stopped and remains standing for the purpose aforesaid.

PHILADELPHIA.

The city of Philadelphia has a population of 1,600,000. Its area is 127 square miles. The transit facilities at present provided are:

	Miles of Single Track.
Surface lines (tramways)	564
Rapid-transit lines (underground and elevated railways)..	14
Total	578

The whole of the lines are operated by the Philadelphia Rapid Transit Company. The most striking traffic feature in this city is

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the small mileage of rapid-transit lines. A special feature of the underground facilities is that, at the sides of the tracks laid for the rapid-transit trains, tracks are laid for tramcars, which enter the subway at certain convenient places and handle the local traffic. The system is designed so that the tramways shall act as tributaries to the rapid-transit lines. For some past years there has been a demand for an extension of the rapid-transit facilities, and the city authorities have had a complete investigation made into the subject. For this purpose they appointed a Special Transit Commissioner, and he has made one of the most interesting reports it has been our privilege to peruse.

BOSTON.

The traffic conditions in the city of Boston more nearly approach the conditions in Manchester than any other American city we visited. In the heart of the city they have narrow badly-laid-out streets, and the difficulties of meeting the demand for increased passenger transportation facilities were therefore felt at an early date. But the problem was grappled with when it arose, and the authorities improved their transportation system by adding rapid-transit facilities to the existing surface lines, and by increasing from time to time the rapid-transit mileage in a manner which has shown great foresight. Greater Boston has a population of about 1,000,000, and its area is 42 square miles. The provision of transit facilities between the north-easterly and north-westerly parts of the city and the business centre could only be carried out by means of bridges over or tunnels under the rivers. The transit facilities at present provided are:

	Miles of Single Track.
Surface transit (tramways)	420
Rapid transit (underground and elevated railways)..	26
Total	446

The first development which took place in Boston when the congestion of traffic on the surface lines in the central parts of the city became very acute was the construction of a subway for tramway traffic. This subway was laid under Tremont Street, and was opened for traffic in 1897. It was the first of its kind constructed in any city. The next step in the provision of rapid-transit lines was the construction in 1901 of an elevated railway from the north part of the city to the south. Afterwards extensions were made in 1904, 1908, 1909, and 1912. These were partly subways and partly elevated lines. The present length (26 track-miles) is now being added to by the construction of extensions of the subways and elevated lines. The chief feature which characterises the methods employed in Boston to meet the passenger transportation requirements is the excellent way the various means of transit have been devised to *supplement* one another. The tramway lines and the rapid-transit lines are all operated by one company—the Boston Elevated Railway Company. This method of having only one operating authority for all the means of transit in a city has much to commend it.

CHICAGO.

Chicago, the second largest city in the United States, has a population slightly over two millions, and its area is 180 square miles. Developments are now being proposed in the direction of further rapid-transit lines to relieve the congestion of the surface lines which, in certain streets in the heart of the city, is becoming very acute. The transit facilities at present provided in Chicago are as follow:

	Miles of Single Track.
Surface transit (tramways)	666
Rapid transit (elevated railways)	143
Total	809

There are two separate companies operating the tramways the Chicago City Railway Company and the Chicago Railways Company. The two companies are working the lines under franchises obtained from the municipality, and in granting the concessions the city authorities have carefully safeguarded the interests of the citizens from every point of view.

The proper construction and equipment of the lines, the provision and maintenance of suitable rolling stock, the establishment of adequate car services, and the payment to the city of 55 per cent. of the net profits, have all been secured under the franchise grants. With a view of ensuring that the terms of the franchise are properly carried out, the companies are subject to the control of a board of supervising engineers. We had opportunities of looking into the work of this board, and we found it excellent in every way.

The elevated rapid-transit lines are owned by the Chicago Elevated Railways Company, and they are operated independently of the surface lines. There is an agitation going on in the city for an arrangement whereby the whole of the transit facilities should be transferred to one company. In addition to this, there has been a demand for increased rapid-transit facilities—for the construction of subways. So far, however, the proposals have not found acceptance by the authorities concerned.

PITTSBURG.

The city of Pittsburg has given considerable attention in recent years to its traffic problem. The city's area is now 26,465 acres, and its population about 500,000. There are, however, a number of boroughs and districts surrounding the city, which are served by the tramway system, and the total population of the district is about 1,000,000. The total length of tramways operated by the Pittsburg Railway Company is 592 miles of single track, about 260 miles of which are within the city area. In a recent report upon the traffic conditions of Pittsburg, the city is recommended to rehabilitate its tramway system and to bring it into line with the more up-to-date American systems.

PARIS.

The population of Greater Paris is 3,900,000, and its area is 185 square miles. The city of Paris proper—*i.e.*, the municipal area within the fortifications has as area of 40 square miles, and a population of 2,800,000. Within the municipal area Paris is provided with an excellent rapid-transit system. The Metropolitan (Undergound) Railway was conceived and laid out by the city authorities, and it is leased to a company for a period of 35 years. The route length of the system is about 44 miles, and it is constructed on the shallow subway plan. The average depth of the track below the street level is 37 ft. The municipality found the capital for and constructed the subway itself, and the operating company found the capital for and constructed the track and the equipment of the lines.

The company pays to the city a royalty upon each passenger carried, and this not only covers the interest and sinking fund on the money borrowed by the city for the construction of the subways, but it provides a substantial profit to the city. The company also makes substantial profits upon its own investment Dividends have been paid in recent years at the rate of 8 per cent.

The Metropolitan Railway is operated quite independently of the surface-transit lines, and from the time of the construction of the first portion of the line it had an adverse effect on the tramway and omnibus traffic The rapid-transit line obtained only a small portion of its traffic by depleting the surface lines. The bulk of its traffic was entirely new.

There is another company which has been granted a concession for an underground line, namely, the Compagnie du Chemin de fer Electrique Souterrain Nord-Sud. This line has been constructed so as to provide a direct means of rapid transit between the northern and southern parts of the city.

The success of the rapid-transit lines in Paris has been very pronounced, and the opinion was expressed in the city a few years ago that underground railways would ultimately supplant all other transit facilities. Such an opinion is very remarkable, but it must have been made without knowledge of the possible development of the surface-transit lines which is now taking place in the city.

Prior to the year 1910 the tramways in Paris and its environs were operated by 13 separate tramway companies, but in that year the concessions granted to several of the principal companies expired, and this afforded the authorities a favourable opportunity of entering into arrangements for re-organising and improving the surface-transit facilities of the city. Proposals were made for their municipalisation, but this step did not meet with approval, and it was ultimately agreed to grant concessions to private companies subject to controlling regulations in the interests of the public.

The new concessions which came into force in 1910 were granted to the three companies as follow:

(1) *To the General Omnibus Company of Paris*—

The main portion of the system of tramways within the municipal boundaries of Paris, and also the exclusive right of running motor omnibuses within such boundaries.

(2) *To the Tramway Company of Paris and the Department of the Seine*—

The northern tramway system, situate largely outside the municipal boundaries but extending to certain points within the city on the north side.

(3) *To the Parisian General Tramways Company*—

The southern tramways system, extending from certain points within the city to numerous outside districts on the south side of the city.

The concessions are granted for a period of 40 years, and very stringent conditions are imposed upon the companies as regards the equipment of the systems, the operation of the services, and the fares to be charged.

The concessions prohibit any overhead trolley lines being constructed within the central area of the city. In this area the tramways are to be operated on the conduit system. The tramway tracks are being gradually reconstructed, and new rolling stock of an up-to-date type is being provided. Omnibuses have always occupied a somewhat prominent position in the surface-transit facilities in Paris—indeed, omnibuses originated in this city. The new concession provided that motor omnibuses must supersede the old horse 'buses, and the company, after experimenting with many types of motor 'buses, has adopted a single-deck 'bus. Two separate compartments are provided

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in each 'bus—one for first-class passengers, and the other for second-class. There is an important area in the central part of the city from which tramways are excluded. Surface-transit facilities in this area are provided by motor omnibuses.

The city of Paris is the only place where practically the whole of the surface-transit facilities—tramways and motor omnibuses—are operated by one authority on a large scale, and it was thought, therefore, that one might obtain an unbiassed opinion as to the merits and demerits of the two systems from the point of view of the management. On this question being put to the officials there was a strong pronouncement in favour of the tramways, mainly on the ground of less cost in operation.

BERLIN.

Greater Berlin has a population of 3·2 millions, and its area is 119 square miles. The transit facilities of the city and surrounding districts consists of (*a*) a large network of tramways, (*b*) a comparatively short mileage of rapid-transit lines, and (*c*) numerous motor omnibus services. The existing rapid-transit lines are partly elevated and partly in shallow subways. The first portion of the line was constructed in 1902, and various extensions have taken place from time to time since then. When all the lines now under construction and those in contemplation have been completed, the total length will be about 29 miles. The elevated lines—running down the centre of wide streets—have been constructed so as not to give offence from an æsthetic standpoint. The subways have been constructed as near to the street surface as possible. The lines are operated by a company—the Hochbahngesellschaft.

The large network of tramways in Greater Berlin is operated by a company—the Grosse Berliner Strassenbahn. There are a number of important streets in the heart of the city from which tramways are excluded, and surface transit in these streets is provided by motor omnibuses. The motor omnibuses are operated by a company independent of the tramways company, and in recent years they have so extended their mileage that the competition with the tramways and also the rapid-transit lines has begun to be felt. The experience in London in this connection has not been lost sight of in Berlin, and the tramway company and the rapid-transit company have recently jointly acquired a controlling interest in the omnibus company.

VIENNA.

The population of Greater Vienna is just over two millions, and its area is 92 square miles. Vienna is the only large city on the Continent where the tramway system is owned and operated by the municipality, and this, added to the fact the city has just had a thorough investigation made with the object of introducing a number of new rapid-transit lines to meet the city's growing transportation needs, makes the Vienna problem very interesting.

At the present time there is a rapid-transit line—the Stadtbahn or State Railway, partly elevated and partly underground which was originally constructed for State purposes, and is, therefore, not well laid out for dealing with local passenger transportation. It is a steam-driven line, but is just about to be electrified. It forms a connection between a number of the main line railway stations. The proposed new rapid-transit lines closely follow the line of the flow of traffic, and it is intended to construct them on the shallow subway plan.

A special feature of the surface-transit lines is that, like many other cities, the tramways are practically excluded from a certain area in the central portion of the city. There is a ring-line of tramway constructed round the excluded area, and from this the radiating lines extend to all parts of the city. The existence of this tramway-prohibited area obviously opens the door to motor omnibus operation, which can furnish the *through* services the tramways are prevented from doing. It is also favourable to the construction of rapid-transit lines. The motor 'bus services have not, so far, made much headway.

LONDON.

Most of our readers being familiar with the railway and tramway arrangements in London we omit the details given by Mr. McElroy in regard to that city. We, however, give a few leading statistics and comparisons with New York which are of much interest. The mileage of tramways and local railways (rapid-transit lines) is as follow:

	Miles of Single Track.
Tramways	653
Rapid-transit lines (local railways)	408
Total	1,061

During the year 1912 the total number of passengers carried was 1,785,602,527. These were distributed between the various surface and rapid-transit lines as follow:

Rapid transit (local railways)		436,492,548
Surface transit—		
Tramways	797,487,581	
Omnibuses	551,622,398	
		1,349,109,979
Total		1,785,602,527

A Comparison between London and New York.

It is interesting to compare the above figures with those of New York. The comparison is shown below:

	Surface-Transit Passengers.	Rapid-Transit Passengers (Local Railways).	Total.
Greater New York	849,878,855	843,835,887	1,693,714,742
Greater London ..	1,349,109,979	436,492,584	1,785,602,527

It must be noted that in London a large number of passengers are carried on the local portions of the main line railways, the figures for which are not available; but, notwithstanding this, it is clear that rapid-transit travelling in New York is considerably greater than it is in London

GLASGOW.

The tramway system in Glasgow is very briefly dealt with in the report.

LESSONS FROM THE INVESTIGATION.

In the second part of the report lessons drawn from the investigation are dealt with. Among the lessons are the following:

It is essential that every city should have a permanent authority directing the initiation and carrying out of all schemes for new transit facilities, in order that there may be continuity of policy, and that future needs of the city and the surrounding districts over a wide area are properly looked after. It is also desirable that all the means of passenger transportation—both surface and rapid transit—should be centralised under one management. If the management is not that of the city itself, then it should be subject to control and regulation by a permanent authority appointed by the city.

In planning underground lines for rapid transit, the aim should be to supplement the surface-transit facilities: the rapid-transit lines should be laid so as to follow as closely as possible the direction of the flow of the greatest volumes of traffic, and the surface lines should be adapted so as to act as feeders to the rapid-transit lines at all convenient points.

On account of the great initial cost, the construction of underground rapid-transit lines cannot be justified unless there is a very large volume of traffic to be dealt with; speaking generally, underground subways for tramcars are an unjustifiable expense, owing to the comparatively small number of passengers it is possible to pass through them by single or double-unit cars. Underground lines, if they are to be placed upon a paying basis, must be worked by high-speed trains, operated at a very close headway. This demands a great density of traffic.

Motor 'buses have proved themselves to be an exceedingly valuable means of surface transit—especially under conditions such as exist in London and Paris; but the question of their general adaptability for conditions which exist in other cities, and the part they will play in the future, either in supplanting or supplementing the existing tramway facilities, calls for a careful analysis of their advantges and disadvantages from the local point of view.

The Investigation of Minor Points.

We did not neglect to look into many detail matters connected with tramway construction and operation in all the towns we visited. These minor points will be considered, and, if found advantageous, put into practical shape in the every-day work of the department. There are, however, a few special points which should guide future tramway developments, viz.:

(1) Tramcar design requires further study. Improvements should be directed (*a*) to more rapid loading and unloading, and (*b*) to the prevention of boarding and alighting accidents.

(2) The number of stopping places should be reduced so as to increase the average speed of the cars.

(3) Fare collection requires simplification, and the possibility of leakage further reduced.

The report proceeds to give statistics of the growth of tramway traffic in various cities in proportion to population and of the number of journeys per head of the population. In this connection some tables may be quoted.

Growth of Passenger Traffic in London and New York.

The following table shows the growth of passenger traffic, the population served, and the number of journeys per head of population in Greater London and Greater New York:

Greater London.

Year.	Passengers Carried.	Population Served.	Journeys per Head of Population.
1870 ..	102,359,885	3,813,632	26·8
1880 ..	256,417,077	4,670,243	54·8
1890 ..	506,872,203	5,540,430	91·5
1900 ..	819,244,029	6,484,516	126·3
1910 ..	1,566,277,272	7,182,843	218·5

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Greater New York.

Year.	Passengers Carried.	Population Served.	Journeys per Head of Population.
1860 ..	50,893,814	1,174,779	42
1870 ..	152,571,486	1,478,103	103
1880 ..	290,822,900	1,911,698	152
1890 ..	575,688,878	2,607,414	221
1900 ..	850,792,564	3,437,202	247
1912	1,693,714,742	5,073,475	333

The percentage increases are shown on diagrams Nos. 37 and 38.

POPULATION SERVED PER ROUTE-MILE OF TRAMWAYS IN VARIOUS CITIES.

The following table shows the population per route-mile of tramways in the large cities in the United Kingdom and in America:

	Population per Route Mile.
British Cities:	
Bradford	6,228
Leeds	8,196
Manchester	9,577
Sheffield	11,607
Glasgow	11,660
Liverpool	11,737
Birmingham	13,512
London	21,076
American Cities:	
Boston	5,214
Philadelphia	5,748
Chicago	6,560
New York	8,586

ESTIMATED GROWTH OF PASSENGER TRAFFIC IN MANCHESTER.

Taking the area now served by the Manchester and Salford tramway systems, the growth of the population during the last three decades has been as follows:

Year.	Population.	Increase.
1881	825,335	—
1891	976,449	151,114
1901	1,114,461	138,012
1911	1,249,980	135,519

If the rate of increase during the last decade be maintained, the population 20 years hence will be just over 1,500,000.

Having regard to the data already given, I estimate that the number of journeys per head of population will by that time have reached 300, consequently the total passengers carried will be at least 450,000,000.

LIMITS TO GROWTH OF A TRAMWAY SYSTEM.

This is the subject of Part III. of the report. The ultimate volume of traffic which a tramway system can deal with is limited by the capacity of the arterial lines near the central parts of the city. When the traffic on these lines approaches the "saturation" point, then additional main arteries must be opened out or other transit facilities provided.

It has been made quite clear in the committee's interim report that there are certain main arteries approaching the central area in Manchester—particularly London Road and Oxford Road—that have practically reached the limit of their capacity, and they will be quite incapable of dealing with the increased traffic which will have to be handled from the southerly and easterly sides of the city.

The new transit facilities which might be provided are:

(1) Rapid-transit lines: (*a*) in shallow subways; (*b*) in deep level "tubes"; or (*c*) on elevated structures.

(2) Shallow tramway subways in the congested areas into which the surface cars could be run.

(3) Motor omnibuses.

Each of these alternatives requires careful consideration.

It is beyond question that rapid-transit lines on elevated structures would be unsuitable, and would not be permitted in Manchester, owing to their unsightliness, noise, and detriment to adjoining property. As to shallow subways and deep-level "tubes," undoubtedly, from the passengers' point of view—from the point of view of time-saving—shallow subways are much to be preferred to "tubes"; but engineering and financial considerations must enter into the question when a particular scheme is under review. There is no doubt that the time is rapidly drawing near when Manchester will have to be provided with rapid-transit facilities, and the lines should be so laid out that they can be worked in conjunction with the surface lines. The cost of rapid-transit lines constructed on the shallow subway plan cannot be stated until a definite scheme is prepared, and the engineering difficulties inseparable from the construction are fully gone into. But a general all-round figure of, say £500,000 to £700,000 per mile of double track may be taken as roughly representing the cost, which will, of course, largely depend upon the engineering difficulties which will be encountered.

The following table shows the number of passengers carried per route-mile per annum on the rapid-transit lines in the undermentioned cities, viz.:

	Passengers per Route-Mile per Annum.
American Cities.	
New York (Manhattan and Bronx) ..	9,124,500
Brooklyn (including Queens)	3,241,200
Chicago Elevated Lines	2,041,800
Philadelphia	4,786,500
Boston	4,054,400
Continental Cities.	
Paris (Metropolitan)	8,878,600
Berlin	4,730,000
London "Tubes."	
Central London	4,883,707
City and South London	3,348,065
Great Northern and City	3,651,000
London Electric	4,535,475

For comparative purposes the following figures as to the passengers carried per route-mile on the principal tramway routes in Manchester are interesting:

Route.	Passengers per Route-Mile per Annum.
Stockport Road	4,486,240
Palatine Road	3,588,080
Rochdale Road	3,382,720
Oldham Road	3,315,840
Cheetham Hill Road	3,116,960
Hyde Road	3,074,720
Ashton Old Road	3,055,360

RAPID-TRANSIT LINES AND SUBWAYS.

Whilst I have come to the conclusion that the time is not quite ripe for the immediate construction of such lines in Manchester, it is essential that detailed consideration should be given without delay to the planning of a general scheme to be constructed later on by instalments, as developments from time to time take place. It cannot be too strongly emphasised that the future passenger transportation requirements of the city will be best met by the rapid-transit system being so laid out that it can be "dovetailed" into the tramway system, and the two worked as a combined system. Hence the necessity of the scheme for the rapid-transit lines being prepared by the Corporation.

It has been indicated that the provision of subways into which the tramcars can be run so as to relieve traffic congestion within the central area are not justifiable, on account of the great cost of their construction and the relatively small amount of traffic which can be passed through than in single or double-unit cars. Another disadvantage of tramway subways is that we should practically be obliged to adopt single-deck cars, the carrying capacity of which would be much less than our standard cars.

PROVISION OF NEW ARTERIAL LINES AND CITY TERMINALS.

This is the subject of the fourth part of the report. An examination of all the possible methods of meeting the immediate requirements of Manchester's passenger traffic leads to one conclusion, namely, that the first step to be taken is to improve and make more efficient the existing tramway system.

As the result of careful deliberation, the following proposed new routes are submitted for the committee's consideration, viz.:

(1) A line along Aytoun Street and thence along a proposed new road in continuation of Aytoun Street to join London Road at its junction with Whitworth Street.

(2) A line along a proposed new road commencing where the above new road crosses Auburn Street, and passing thence to the junction of Chorlton Street and Whitworth Street, and from there behind the School of Technology to Temple Street, along Temple Street and Higher Temple Street to Brunswick Street, and thence continuing along a proposed new road into Stockport Road at or near Wilson Street.

(3) A line along a proposed short length of new road connecting Whitworth Street with York Street, and thence along York Street to Rusholme Road.

(4) A line along Medlock Street from City Road to Stretford Road, and thence along a proposed new road in a straight line to Bradshaw Street and Princess Road.

(5) A line line from Whitworth Street along Lower Cambridge Street and Higher Cambridge Street to Coupland Street, with two proposed new branches therefrom joining on to Lloyd Street and Carter Street.

(6) A line along a proposed new road from the junction of Great Jackson Street and Stretford Road in a straight line to Upper Moss Lane and Alexandra Road.

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SUGGESTED LINES IN NEW OR IMPROVED STREETS IN THE CENTRE OF THE CITY.

The streets in the centre of the city are so badly laid out for traffic purposes that a determined effort should be made to effect some improvement, and the following proposals are submitted for the committee's consideration:

(1) A proposed new street connecting St. Peter's Square with Albert Square—forming a continuation of Oxford Street. The adoption of this proposal will enable Albert Square and St. Peter's Square to be used as valuable tramway terminals.

(2) A widening of Fountain Street from Market Street to Princess Street, and of Cooper Street from Princess Street to the above-named new street.

PROPOSED TRAMWAY TERMINALS.

It has been found in the past in connection with the tramway service that the running of through routes across the heart of the city has been advantageous both from the operating and from the passengers' points of view, but the continuous growth of traffic on the various routes converging into a few irregularly laid-out streets in the heart of the city must obviously lead to limits being fixed to the through-route system.

The necessity for limiting the through-route system has caused us to consider the question of the establishment of suitable tramway terminals in or near the city centre.

After consideration the following terminals are recommended: (1) Old Infirmary site, (2) Albert Square, and St. Peter's Square, (3) High Street, (4) Cannon Street, and (5) an improvement in present facilities at Stevenson Square terminal.

FINANCIAL QUESTIONS.

This is the subject of Part V. of the report. After considering past records it says that the amount of net revenue which will be available from the working of the tramways system for meeting the fixed charges on such portion of the capital expenditure as may be allocated to the tramways department in connection with the improvement schemes proposed will depend upon the future policy of the Corporation as regards (*a*) the amount to be applied in relief of the rates from the profits of the department and (*b*) the question of further reduction in fares.

The City Council last year determined that the amount to be handed over by the Tramways Committee in relief of the rates should be 5 per cent. on the capital expenditure of the department. If this policy be continued in the future it will at once put an end to any proposals such as those outlined in his report. If the tramways department is to improve and develop the transit facilities of the city, a limit must be placed, at any rate for some time, upon the amount to be applied from the revenue in rate relief—say, not more than £100,000 per annum.

The question of any further reduction in fares must also be carefully considered. Any drastic action in this direction would result in a serious decline in the disposable net revenue.

If the amount to be applied in relief of the rates is not increased above the sum of £100,000 per annum and no drastic action is taken as regards the further reduction of fares, the tramways department, having regard to the amount now in the reserve and depreciation fund, would be capable of bearing the costs of the suggested improvements, if carried out over a series of years, to the extent of £1,000,000.

SUMMARY OF PROPOSALS.

The sixth and last part of the report summarises the principal proposals as to the initial steps to be taken. These include the new arterial routes and tramway terminals already mentioned, and, besides the opening up of negotiations with the Corporation of Salford as regards the tramway traffic entering the city from the Salford side, the introduction, on a limited scale, of transfer tickets, to enable passengers to travel from the tramway terminals to certain points in the city centre by changing cars.

THE TRAMWAY REVENUE MUST BE MADE SECURE.

If the Corporation determines to carry out the proposals outlined in this report, and if the revenue of the tramways department is to be relied upon to meet a large part of the expense entailed, it is of the utmost importance that steps should be taken to secure the department against unfair competition in the passenger transportation business of the city, and if necessary further statutory powers should be obtained with this end in view.

CHICAGO RAILWAY TERMINAL COMMISSION.

The ordinance authorising construction of a new Union passenger station in Chicago, passed by the City Council on March 23, included provisions constituting a permanent railway terminal commission. This body will consist of seven members, and will make a study of the entire terminal situation. The mayor will appoint five of the seven members of the commission; of the remaining two, one will be recommended by the Citizens' Terminal Plan Committee, and the other by the Chicago Plan Commission.

COMPARATIVE ECONOMICS OF TRAMWAYS AND RAILLESS ELECTRIC TRACTION.*

BY THEODORE GRAHAM GRIBBLE.

The railless electric traction system, otherwise designated the trolley 'bus, or trackless trolley, already forms in several cities an extension to the tramways system, and the applications to Parliament for the authorisation of similar lines are numerous. The purpose of the paper is to discuss the various economic features of the system, as compared with those of tramways, with a view to the definition of the sphere of usefulness which is open to the former. The initiation of the system in this country, in contrast with the general history of new forms of transportation, is due, not to Government aid or private enterprise, but to municipal tramway committees. The author pointed out that the Light Railways Act has failed to effect what was intended by it, and, in contrast, drew attention to the immense and profitable development of light railways in Belgium.

The necessity for the further utilisation of the highways is urged, because of the centralisation and congestion of population which has resulted from the development of the railway system. The distinctive economic features of tramways and railless electric traction are defined, and an analysis is made of the statistics of British municipal tramways, both as to cost of construction and working expenses. Railless electric traction is compared with the tramway as to carrying power, capital expenditure, and working costs, by means of generalisations deduced from the above statistics. These generalisations are in the form of curves and tables. The working expenses are analysed in a table.

Attention is drawn to the great variation in the cases cited of the cost of energy, greater than can be accounted for by the price of fuel. Cases are added of foreign tramways which operate with trailer cars. An illustrated description is given of tests made by the author of current consumption on an electric omnibus propelled by means of accumulators on London streets, also of tests made on a railless electric car at Bradford. The general conclusion drawn is that it requires no more current to carry the passenger by railless electric traction than it does by a tramway. The maintenance of rubber tires is touched upon in regard to the principal causes of wear and tear, and of the effect of tropical climates.

The subject of the responsibility for the upkeep of public roads is dwelt upon at some length, in view of the altered conditions resulting from the introduction of mechanically-propelled vehicles. The present necessity of special Acts of Parliament for the authorisation of railless electric lines is represented as a hardship which calls for relief at the hands of the Legislature. The comparative economics of tramways and railless electric traction are finally embodied in three diagrams, arranged to show the respective capital expenditure and working expenses under analogous conditions for services of different traffic density, ranging from a service at 30 minutes' interval to one at 2½ minutes.

The general conclusions are: (1) That with a traffic density represented by a 2½-minute service - that is to say, one of the largest tramways – the economy of construction and operation is still in favour of railless electric traction: as to the cost of operation by about 7 per cent., and as to cost of construction by about 44 per cent. (2) That the economy increases inversely with the traffic density; so that with a time interval of 30 minutes, the economy of operation is about 36 per cent., and that of cost of construction about 70 per cent. Reference is made to the York tramways, the most recent case of a municipal tramway, in support of the argument that an even more important point than that of saving of expenditure is the possibility, by means of economic transportation, of serving the suburbs and the rural population. It is argued that the tramway at York, six miles in length, excellent though it is, does not serve all the suburbs, and that by means of railless electric traction, for the same capital expenditure, 16 miles might have been constructed and operated; thus completely reaching the extreme suburbs, and incidentally raising the value of property in the vicinity of the city. In conclusion, a tribute is paid to the enterprise and initiative ability of the leaders of municipal tramways in having taken up the burden of experiment and proof of the system which seems to them the normal form of extension of their tramways.

Proposed Westinghouse Memorial. — The *Electric Railway Journal*, of New York, states that a plan for a memorial to the late George Westinghouse has been suggested. Among the tentative features are that it take the form of a statue, and that this be erected in some open space in Washington, D.C., where Mr. Westinghouse spent some of his later years. A fund of $25,000 or $30,000 will probably be required. This movement will receive the hearty support of members of the engineering and allied professions who owe so much to Mr. Westinghouse's work.

* Abstract of a paper read at a meeting of the Institution of Civil Engineers, March 25.

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AN AMERICAN MANAGER FOR THE GREAT EASTERN RAILWAY.

THE QUESTION OF ELECTRIFICATION.

Mr. H. W. Thornton, superintendent of the Long Island Railway, New York, has been appointed general manager of the Great Eastern Railway, and will take up his duties during the present month. The appointment is of more than ordinary importance, because of the facts that a large part of Long Island railway is worked electrically, and that Mr. Thornton is likely to be called upon at an early day to go into the question of electrifying the suburban lines of the Great Eastern in order better to meet the competition of the tramways and motor omnibuses than is possible by reduced fares.

Mr. H. W. Thornton.

Of Yorkshire descent, but born at Logansport, Indiana, in 1871, Mr. Thornton was graduated as a civil engineer at the University of Pennsylvania in 1894, and in the same year entered the service of the Pennsylvania Railroad on the staff of the lines west of Pittsburg. After some experience in the chief engineer's office, he became assistant to Mr. Ralph Peters, the present president of the Long Island Railroad, who at that time was the general superintendent of the Pennsylvania. Later Mr. Thornton was appointed superintendent of various Pennsylvania divisions. In 1911 he went to the Long Island Railroad, which had become a subsidiary of the Pennsylvania.

Mr. Thornton, who had come to London early in February on the cabled request of Lord Claud Hamilton, in an interview before his departure from London for New York, on February 21, said: "I have been able to see that the Great Eastern system resembles the Long Island system in many respects. It has a very large suburban business, larger than the Long Island Company, and both systems do a great deal of short-haulage work. I believe I am the first American manager to come and take charge of an English railway, but there is no justification for an inference that American ideas are to be introduced except those fundamental ideas which are considered good business in any part of the world. The governing principle is to provide people with what they want.

"From the nature of the suburban line, its numerous viaducts and bridges, it would be a difficult problem to convert it electrically, but the obstacles are by no means insurmountable. In considering this question of electrification there are several striking similarities between the Great Eastern and the Long Island Railroad. At Long Island we have the same rush hour traffic to deal with, although it is not so heavy. Our electric system covers in the aggregate 203 miles, and it cost £8,000 a mile. I cannot say how this would compare with any electrical conversion in London. There are other similarities. The two systems both depend largely on goods traffic, and they are both faced with important problems of assisting farmers in marketing produce. In speed the British railways excel tremendously. While your shorter trains can be moved more rapidly, we have heavier engines drawing longer trains over greater distances. My efforts as general manager of the Great Eastern will be to weigh carefully the advantages of both systems, and to weld together the most economic conditions and to enforce them. The Great Eastern, in common with other London lines, is faced with the motor omnibus competition. I cannot say if the fares will be lowered, they are pretty low at present, but having built up a suburban traffic, the Great Eastern intends to keep it. I hope to get in close touch with all my staff. If that is an innovation it is, at any rate, a very useful one. Only by knowing intimately the men who are working with you can a manager get the best out of them. A chief in America is always accessible, and he never refuses an interview with a newspaper man."

The Long Island Railroad.

Articles in previous issues of this journal have explained in detail the physical connection which has now been in existence for several years between the Pennsylvania and the Long Island Railroads. The former line crosses the Hudson River from Jersey City to New York in tunnel, and continues underground to an enormous and magnificent station right in the heart of New York. The tunnels are continued eastward under the East River to Long Island where a junction is made with the Long Island Railroad. All the underground portion of the lines is worked electrically, and so are the Long Island lines in Brooklyn, Queens, and neighbourhood. Out of a total of 400 miles of route, representing lines owned and leased by the Long Island Company (which is controlled by the Pennsylvania Company), about 150 miles of single track are worked electrically. Trains began running between New York and Long Island in 1910. The electric equipment of the latter section is on the protected third-rail system using direct-current at 600 volts. Multiple-unit trains are employed. In addition to the passenger service a certain amount of light goods business is done. Though the electric traction system is on a large scale, requiring the use of about 350 passenger cars and 80 baggage cars, it has been somewhat dwarfed in the minds of those at a distance by the enormous magnitude and cost of the work of the Pennsylvania Company's tunnels and the station in New York. The Long Island line operates the most extensive suburban traffic in the United States by electric traction; 40,000,000 passengers are transported yearly over its total of 400 miles of electric and steam railway. The Great Eastern owns 1,061 miles of railway, and partly owns 149 more, while the number of passengers carried is over 100,000,000 a year. Mr. Thornton has handled over 1,000 scheduled trains daily over lines disturbed by improvement works on a large scale.

RAILWAY BENEVOLENT INSTITUTION.

Lord Wolverton will preside at the fifty-sixth annual dinner of this Institution on May 4. Although railwaymen subscribe liberally to the Institution, it mainly depends for support upon the aid of the public. It has rendered assistance to 179,584 persons, including 6,077 widows of men killed, 18,692 widows of men dying of sickness, 150,790 men injured by accidents, and 3,576 men disabled by old age and other causes. At the present time 2,289 widows and members are receiving annuities which alone involve an annual liability of £38,456, and 376 children are being reared, trained, and educated in the orphanage at Derby and at other schools at a cost of nearly £9,000 per annum. Few institutions have a record of such useful work, and subscribers have the assurance that they are participating in a truly benevolent undertaking which is managed with the greatest care and success. In Mr. H. A. Mills it has a secretary whose unselfish devotion to its interests has long being known to everyone acquainted with the work which the Institution has so well carried on.

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COMMERCIAL MANAGER FOR LEEDS.

A New Plan for Dealing with Municipal Employees.

Mr. J. B. Hamilton, the Tramways Manager, becomes also Head of the Labour Department of the City.

On March 18 and 27 the Leeds Corporation discussed the report presented by Aldermen C. H. Wilson, F. M. Lupton, R. A. Smithson, J. R. Ford, and F. Kinder, the special committee of the Leeds City Council, who were given special powers to deal with the recent strike of the municipal employees, which they very successfully brought to a prompt and decisive conclusion. The committee made the following recommendations:

(I.) That a General Purposes Committee be formed, and that the committee consist of seven members.

(II.) That the Council delegate to such committee full power to deal with all matters arising out of or in connection with—(*a*) The appointment, control, and dismissal of all workmen; (*b*) wages, hours, and conditions of labour of all workmen; (*c*) the distribution and supply of labour to the various departments; (*d*) the reorganisation of the cleansing and highways departments.

(III.) That Mr. J. B. Hamilton be appointed executive officer of the General Purposes Committee at a salary of £500 per annum, to act under the instructions of the committee in the above duties, and in such other duties as may from time to time be delegated to the committee.

(IV.) That only applicants who are found suitable, and are certified as fit after being medically examined, shall be permanently engaged.

(V.) That no one in an official position shall be a member of a union existing amongst those over whom the official is placed.

(VI.) That the City Council meet once in each quarter, and that the necessary consequential alterations be made in the Standing Orders and delegation of duties to committees.

The committee add: "The strike has shown the necessity for improved methods of dealing with wages, conditions of work, hours of labour, etc., of municipal workmen. To enable such matters to be dealt with properly, the fullest information as to comparable work in other towns must be systematically obtained, as well as the conditions obtaining with private employers in the city, and also with trade unions, where standard rates have been established. The formation of a commercial department for obtaining and collating such particulars is an absolute necessity. This would probably lead to a similar arrangement in other cities, and there would thus be a constant interchange of actual facts.

"We recommend that a General Purposes Committee be appointed as one of the standing committees of the Council, with power to act in regard to all the foregoing matters. In our opinion such committee must be entrusted with the general arrangements as to labour in all departments of the Corporation. To enable this to be carried into effect, it is necessary to appoint a commercial manager to carry out the work above indicated. One important result of such appointment would be to eliminate casual employment, and to render permanent as far as possible the positions of men who are efficient under the Corporation."

In their report the committee stated that:

"The road work of the highways and tramways departments touch at so many points, and overlap in so many ways, that uniformity of control as regards the maintenance of the roads and the paving of the permanent ways would result in considerable saving, and a great reduction in inconvenience to the citizens. It is therefore a matter for grave consideration whether the direction and control of the whole of the streets and highways of the city should not be combined in one department.

"In the tramways department over 2,000 men are employed. The general rule that has been in operation for many years is that no official in charge of other men shall be a member of any union. Consequently, when the strike was declared, everyone in an official position, including foremen, inspectors, timekeepers, gangers, and leading hands remained at their posts, and it is not too much to say that the speedy termination of the strike in this department was due to the fact that so large a body of men remained loyal. A considerable portion of the work of the tramways department, particularly in the repair and renewal of the permanent way, is seasonal. At the present time many men who are employed in the tramways department through the summer go to the gas works during the winter, but in the absence of a central organising office for the exchange of labour between the different departments, a very considerable amount of casual employment ensues. We hope that as a result of our inquiry and recommendations this will not obtain in the future."

Alderman Wilson, in presenting the report to the Council, said that the heads of the cleansing and highways departments and also a minor official of one of the departments had resigned, while a fourth had died. It was over these two departments, as well as the tramways, that Mr. Hamilton would preside, with an increase of £500 to his present salary of £1,000.

The committee's recommendations were adopted with the exception of the proposal for holding the meetings of the Corporation quarterly, and for a medical examination for all workmen. The examination is, however, to be confined to men taken on for dangerous work. Opposition was expressed to the election of Labour members on the General Purposes Committee, and the final selection was deferred until the next meeting, on April 1, when Alderman Wilson submitted the following names: Aldermen C. H. Wilson, F. M. Lupton, R. A. Smithson, T. Oldroyd (Conservatives), Alderman F. Kinder and Councillor J. Eddison (Liberals), and Alderman W. H. McShane (Labour). In place of the last-mentioned name, an amendment submitted by the Labour party for the election of Councillor Arnott as their representative was agreed to. In introducing the Budget, Alderman Wilson stated that the cost of the strike would exceed £100,000

Mr. J. B. Hamilton.

Mr. J. B. Hamilton was appointed general manager of Leeds Corporation Tramways in 1902, and before taking up his duties he visited the United States and Canada in order to examine the larger systems there He came to Leeds from Glasgow with a high reputation as an organiser and administrator. As traffic manager of the Glasgow Corporation Tramways since the undertaking began to be worked by the Corporation in 1894, he was associated with Mr. John Young in the organisation of the department. In 1897 his responsibilities were greatly increased by the decision of the Corporation to electrify their tramways. Under the general manager he had charge of the first power-station erected, of the rolling stock, and of the staff. That his first year's work at Leeds was successful was shown by the transfer of the sum of £62,000 to the relief of rates. At the same time concessions were made in fares, and improved conditions were granted to motormen and conductors. Meanwhile Mr. Hamilton had found time to assist several other Corporations which were establishing tramways, and his services have since been frequently requisitioned in proceedings before Private Bill Committees at Westminster, and tramway arbitrations and inquiries. Mr. Hamilton was president of the Municipal Tramways Association in 1906, and has been an active member of the council since its formation in 1900. He has frequently received flattering invitations to leave the service of Leeds Corporation, but he has preferred to remain at the head of its tramway department, with whose interests he has now been so long and so successfully identified. In accepting the new responsibilities that the Corporation have now placed upon him, he will retain the general management of the tramway undertaking, which, of course, employs more men than any other department of the city.

Mr. J. B. Hamilton.

Thermit Rail Welding.—During the year 1913, nearly 17,000 tramway rail points were welded by the Thermit process. The total number of rail joints welded throughout the world was over 108,000. All the tramway welds executed in the United Kingdom were in new or reconstructed track. The figures indicate the increasing favour with which permanent way engineers regard the Thermit-welded track.

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BELFAST TRAMWAYS AND PROFIT-SHARING.

IRISH SECRETARY'S OFFER TO INTRODUCE A BILL.

In the House of Commons, on March 11, Lord R. CECIL asked the Chief Secretary for Ireland whether the Local Government Board auditor had surcharged the members of the Belfast Corporation the bonus paid to their tramway employees; whether this had put an end to the profit-sharing scheme there in force; under what statute the auditor decided the payments were illegal; and whether the Government contemplated legislation to remedy this state of things.

Mr. BIRRELL (Chief Secretary for Ireland): The Local Government Board auditor surcharged salaries and wages to the amount of £2,800 paid on May 4, 1912, to the staff of the tramways department in anticipation of the profits estimated as likely to be earned in respect of the year ended March 31, 1913. The Local Government Board have no official information as to the second paragraph of the question. The auditor's reason for making the surcharge was that the payments in question were not authorised by law. As regards the last paragraph, it is open to the Corporation to initiate any such legislation if they so desire. I may add that the surcharges in question were remitted by the Board on appeal.

Lord R. CECIL asked whether the Chief Secretary would consider the desirability of a change in the general law so as to permit municipalities to enforce such a scheme where they thought it desirable—(hear, hear)—and whether he was aware the destruction of this scheme had been a great disappointment to the tramway men.

The CHIEF SECRETARY said that personally he should be exceedingly glad to see such an alteration in the law made, and if the noble lord could give him any satisfaction on that subject he should be proud to be the author of the bill.

THE G.E.C. ANNUAL DINNER.

The twenty-second annual dinner of the General Electric Company was held on March 14 at the Trocadero Restaurant, when Mr. H. Hirst, chairman of the company, presided over a gathering of some 700 guests. Among a large number of prominent men in the technical and commercial fields present were the Hon. J. G. Jenkins, Hon. Peter McBride, Hon. Sir John McCall, Hon. J. H. Turner, Hon. John Howard and Mr. Richard Reid (Colonial Agents-General), Mr. L. S. Amery, M.P., Colonel Crompton, Mr. W. Duddell (president of the Institute of Electrical Engineers), Mr. R. A. Chattock (president of the Municipal Electrical Association), and many other gentlemen.

In proposing the toast, "The Electrical Industries within the Empire," Mr. HIRST remarked that the company had shared in the general prosperity that had prevailed during the past two years, so much so that they found it was necessary to extend all their works. Mindful of their duty towards those who helped them to success, they had just voted a considerable sum for the erection of very large club buildings for the workpeople and staff. They had extended most of their trading departments, and had gone ahead considerably in the acquisition of rights to supply whole cities with electric light and power. In conjunction with friends, they had started the Pirelli-General Cable works at Southampton. Wire and cable are up to the present the only electrical commodities which they had not produced themselves. When these works were finished, they would have entered the ranks of the few firms in the world who manufactured everything electrical instead of only manufacturing some particular lines; in fact, he believed they were the only firm within the Empire that could pride itself on this achievement. The company had continued the work of establishing themselves in the dominions over sea. There are G.E.C. organisations in Calcutta, Madras, Johannesburg, Cape Town, Durban, Sydney, Melbourne, Wellington, and Toronto. To-day they administered their business from 11 or 12 scattered buildings in or around Queen Victoria Street. To continue indefinitely in this way would be to run the risk of impairing the efficiency of the organisation. The directors had, therefore, secured a site of 26,000 sq. ft. in Kingsway, and would erect a building as high as the County Council would permit them to go, and he believed that when completed it would be one of the largest and finest electrical establishments in the world. Speaking of the future development of the electrical industry, Mr. Hirst said that one ought to aim at certain business ideals, the virtue of which was generally recognised. One common law, one patent law, and one trades mark Act, should prevail throughout the King's dominions. He was sure that the restrictions on travelling in certain territories could be removed to the benefit of all. An effort should be made to establish uniform coinage, and uniform weights and measures. Proper classification of goods, and co-ordination of statistics, would be most helpful.

Mr. J. S. AMERY, one of the party of M.P.'s who recently returned from visiting the oversea dominions, responded to the toast in a clever speech.

The Hon. Sir JOHN MCCALL, Agent-General for Tasmania, gave the toast of "The General Electric Company," and referred in most complimentary terms to the success of the company, which he attributed largely to the skilful manner in which the management had conducted their affairs, and to their having secured the loyal co-operation of the staff.

Mr. W. J. RAILING, responding, thanked Sir John McCall on behalf of his colleagues, staff, and himself, for the kind and cordial reference he had made to the influence of the company, and the part they had played in the colonising mission of the country. He advocated the linking up of the educational institutions throughout the Empire on a co-operative basis, and dwelt upon the importance of training men for important positions outside the watertight compartments so often found in connection with large enterprises.

Responding to the toast of "Scientific Institutions," Mr. W. DUDDEL, president of the Institution of Electrical Engineers, said the object of the institution was to increase the common store of knowledge and to set a high standard of engineering knowledge whereby the country could lead the engineering world.

Dr. Alexander Russell, Mr. L. G. Byng, Hon. J. C. Jenkins, Mr. E. Manville, and Mr. A. J. Walters, K.C., also made interesting speeches, and the whole proceedings were well up to the average of excellence usually associated with the G.E.C. dinners, which has caused them to be regarded as of importance to the electrical industry.

THE CAR QUESTION AT HULL.

BURNLEY VESTIBULES TO BE FITTED TO ALL CARS.

A deputation of the Hull Tramways Committee, accompanied by the city engineer and the tramways manager, have visited Leeds, Bradford, Burnley, and Leicester tramways, the United Electric Company's Car Works, and the Brush Company's Car Works. The deputation reported to the Tramways Committee on March 25 that as far as tramcars were concerned they found nothing which could be looked upon as an improvement upon the type of car in use at Hull. They inspected vestibule cars in Leeds, Bradford, and Burnley, at the Preston and the Loughborough works; also a special construction described as a wind screen in Leicester, the invention of the car superintendent there. A wind screen, however, would not, in their opinion, serve the purpose in Hull. The best type of vestibule for their purpose was, they thought, something on the lines of those at Leeds, Bradford, and Burnley. The vestibule on the Burnley cars was invented many years ago, and, having had a long experience behind it, might now be looked upon as having been a well-considered protective device. It afforded adequate protection, while it did not interfere to any extent with the motorman's hearing or seeing.

The committee recommended that 20 new cars to be purchased should be fitted with vestibules of the type referred to, with such modifications as might be necessary on reconsideration, and that steps should be taken as opportunity offered to have vestibules of similar type fitted to the existing cars, the work to be put in hand and carried out according to the convenience of the car repairing staff. They also recommended that the roof of the top cover of the new cars should be extended in the form of a canopy at each end to protect passengers sitting outside from the weather.

On the question of large versus small cars, the majority of tramway operators whom they consulted were strongly in favour of the small standard car, such as was in use in Hull, as against the double-bogie car capable of seating between 70 and 80 passengers. The small car was easily handled by the motormen, and the conductor had better control, and was more easily able to deal with his fare collection. With differential fares to be collected at short intervals it was very easy to give the conductor more work than he could accomplish by increasing the number of passengers which a car can carry.

The committee decided that tenders should be invited for the supply of 20 car bodies, 20 trucks, and 20 sets of equipment for new cars. It was also agreed that the Council be recommended to authorise the committee to accept tenders. At a meeting of the Council on April 2 the report was adoped.

Russian Railway Electrification.—At an outlay of 15 million roubles the Baltic and Warsaw railways are to be converted to electric working. The work is to be begun early next year.

Electric Vehicle Association of America.—Mr. A. J. Marshall has been appointed permanent secretary, with offices in the New York Engineering Societies' Building, 39th Street, New York.

Parcels Services at Bradford and Tokio.—Tokio Council are considering the establishment of a parcels service, and have asked for particulars of the service carried on in connection with the Bradford Corporation Tramways. The methods there employed were fully described by Mr. C. J. Spencer, the general manager, in an illustrated article in our issue of May 8, 1913.

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FINANCIAL REPORTS AND MEETINGS.

Silverton Tramway Company.—The accounts for 1913, after allowing for depreciation, show a surplus of £57,404, which is carried forward.

South Staffordshire Tramways Company.—At the annual meeting on March 23, Mr. S. R. Blundstone, who presided, said that the mileage and other rents had increased slightly, as had also the interest on investments and loans. There was a slight increase in expense of administration, and they had written off a small amount of depreciation on their investment in Belfast Corporation stock, though the depreciation had since disappeared. The income for the year amounted to £3,546, and they proposed to pay a dividend of 3½ per cent. on the preference shares.

Rhondda Tramways Company.—The annual meeting was held on March 6, Mr. L. B. Schlesinger presiding. An available balance of £12,593 was recommended to be dealt with as follows: Reserve and renewals account, £4,000; dividend on preference shares, being the full dividend of 6 per cent. for 1912 and 2 per cent. on account for 1913, £8,000; carrying forward £593. The report stated that a railless traction system to connect the tramways with the mining districts of Tonyrefail and Gilfach Goch was about to be started. The report and dividend were agreed to and Mr. W. B. Cownie was re-elected a director.

Madras Electric Tramways Company.—Out of a profit of £21,345 and £3,432 brought forward, a dividend of 5 per cent. is proposed on the ordinary shares, adding £7,000 to the renewals fund, writing £500 off issue expenses, and carrying forward £3,320. The traffic receipts show an increase of 7·71 per cent., and further rolling stock is being provided. At the meeting on March 12 the chairman (Mr. A. M. Quill) said that against the increased receipts there were the increased operating expenses and the additions to wages. Owing to the close working arrangements existing with the Electric Supply Corporation the management in Madras has been merged since December 1 last.

South Metropolitan Tramways and Lighting.—The total revenue for the year amounted to £63,135, compared with £61,944. There remained a surplus of £15,026 and £922 brought forward. The directors proposed to place to reserve £5,000, and to declare a dividend at the rate of 6 per cent. per annum on the preference stock for the year, leaving to be carried forward £775.—Mr. J. Devonshire, in moving the adoption of the report on March 25, said that the profits were £15,025, compared with £15,492. The balance available for distribution was £15,942, and he proposed that £5,000 be placed to reserve, that a dividend of 6 per cent. be paid on the preference shares, and that £775 be carried forward.

Fife Tramways, Light, and Power Company.—Mr. W. Low, presiding at the annual meeting, said the earnings from the Dunfermline and District Tramways Company during the year paid over to the company as dividends and management fees amounted to £15,020, compared with £12,200 for 1912. There was growth of traffic on all lines, and on certain sections, if the increase continued, it would be desirable to consider doubling portions of the track. They proposed to issue preference shares with a view to paying off loans contracted to meet the expenditure on extensions. This would leave the company free to issue debentures for future developments, such as the tramway to Rosyth Naval Base and the development of the power company's business. Resolutions were passed increasing the capital from £300,000 to £400,000 by the creation of 50,000 preference shares and 50,000 ordinary shares.

Para Electric Railways Company.—Mr. Tollett Holt, presiding at the ninth ordinary meeting in London on February 27, said that in the past year the total gross receipts derived suffered a reduction of 2·4 per cent., to £299,925, and the operating expenses 1·8 per cent., to £164,262, the ratio of expenses to receipts working out at 54·8 per cent., as compared with 54 per cent. in the previous year, exchange having remained more or less constant. After making all necessary provisions and allowing for the interim dividend there was a balance remaining of £48,305, from which the directors recommended the payment of a final dividend of 3 per cent. on the preference shares, making 6 per cent. for the year, and 5 per cent. on the ordinary shares, making 10 per cent. for the year, leaving £19,205 to carry forward. Unless a great improvement in trade took place on the Amazon it might not be possible or wise to recommend the same high rate for the current year.

Jarrow and District Electric Traction Company.—It was reported at the annual meeting on March 12 that 99 per cent. of the holders of the issued capital had accepted the offer received from the Northern Transport Company to exchange their shares for fully paid holdings in the latter company, which has been formed for the purpose of carrying on and developing transport business in all its branches in the northern counties. Mr. G. J. Somerville, who moved the adoption of the report, said the total revenue had amounted to £7,733, which was an increase of £500. They had made provision amounting to £800 for renewals, and they proposed that the balance of £3,301 should be applied: £1,025 to reserve fund, £1,248 in payment of a dividend on ordinary shares at the rate of 2½ per cent. for the year, leaving £1,028 to be carried forward. The dividend was ½ per cent. in excess of that paid last year, and the amount carried forward was £185 more. The company was in a very sound position.

Electrification Contracts of the British Insulated and Helsby Cables Company.—At the annual meeting of the British Insulated and Helsby Cables Company at Liverpool, on March 23, the chairman (Dr. E. K. Muspratt) said the year's profits were £247,351, an increase of £28,956. This was not due to extraordinary volume of business in any one department, but to a general increase Competition was on the increase, but they were quite confident of being able to meet it. Their works remained fully occupied, and some of their contracts were of exceptional magnitude. They had a contract with the London and North Western Railway for the supply of the whole of the high-tension cable for the electrification of the suburban system. This was perhaps the most important electrical contract yet undertaken in this country. The company had also obtained an order for the overhead equipment for the electrification of the whole of the Melbourne Suburban Railways, this being one of the largest contracts of the kind ever placed. By writing £35,000 off patents and goodwill, which originally stood at £251,672, they had extinguished that item. A final dividend of 9s. per share was declared on the ordinary shares, making 13 per cent. for the year.

Stewarts and Lloyds, Limited.—At the meeting held in Glasgow on March 27, Mr. J. Graham Stewart (chairman) said that profits had increased by over £39,000. They had adopted the principle, however, of not increasing the rate of dividend in any one year, unless they were certain of maintaining it. For 20 years the dividend had never been reduced. The past year had been a good one, but the year now entered upon had begun unpropitiously. In the tube department the demand was less, competition was keen and prices were less remunerative, while in the steel department they were faced with severe competition and price-cutting. In view of these facts the directors felt justified in recommending that the extra 6d. per share paid out of profits be distributed as a bonus. The chairman moved dividends of 6 per cent. on the preference shares, 10 per cent. on the ordinary shares, 2s. per share on the deferred shares, and 6d. per share on the deferred shares as bonus. The report showed that after setting aside £100,000 for depreciation, the net profit for the year amounted to £246,064. Adding the balance brought forward, there was available the sum of £336,495. The directors proposed to place £50,000 to reserve and £20,000 to an employee's benefit fund.

British Aluminium Company.—The annual meeting was held on March 27. In proposing the adoption of the report, Mr. A. W. Tait said that the trading profit for the period under review was £268,720, as compared with £194,823. The better result was accounted for by an increase in tonnage, some economising in cost of production, and also largely by a rise in prices over those ruling in the previous year. Prices of aluminium had not, however, been abnormal, having only returned to a reasonable level after the severe depression of the last four or five years, caused by the keen competition between the large producers and the relatively large difference between the production and demand. The report stated that, including £10,207 brought forward, the profit for the year amounted to £278,927. This sum has been dealt with as follows: Provision for income tax, legal expenses, bad and doubtful debts, depreciation, and proportion of profits payable to directors, £23,007; prior lien debenture service fund, £48,000; debenture stock reserve fund, £43,224; reserve for depreciation, £50,000; carried to reserve account, £50,000. The directors recommended a dividend of 5 per cent. per annum, less tax, on the ordinary shares, leaving £16,690 to be carried forward. The reserve account now amounts to £130,000, and the depreciation reserve account to £150,000.

W. T. Henley's Telegraph Company and Railway Electrification.—Mr. Sydney Gedge presided at the 35th ordinary general meeting of W. T. Henley's Telegraph Company, and moved the adoption of the report and the payment for the 10th year in succession of a dividend of 15 per cent., adding a bonus of 5 per cent He stated that the newest and most important field of their work was probably to be found in the electrification of railways. Last year he informed the shareholders that the largest order ever placed for cables for electrification of railways had been placed with this company by the Central Argentine Railway Company. The whole of that cable had been delivered in Argentina, and was being laid under the supervision of the company's own engineers. It was interesting to note, also, that they had been entrusted with a small order for certain cables in connection with the Willesden electrification of the London and North Western Railway. Quite recently they had received an order for cables in connection with the electrification of the suburban lines by the Buenos Ayres Western Railway Company. That would involve something well over £200,000. He was quite convinced that if it were not for the very strong financial position which the company was in, as was shown and published to the world in its balance sheets, such orders as those would not be entrusted to them.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

TABLE I.—TOWNS WITH COMBIHED GEHERATINC STATION FOR TRACTION AND LICHTINC PURPOSES.

Name.	Year Ended.	Electric Traction Inaugurated.	System.	Line open (single track). Mls. Chs.	Borrowing Powers.	Borrowing Powers Exercised.	Unexhausted Borrowing Powers.	Total Capital Expenditure.	Capital Expenditure per Mile of Single Track.	Loans Outstanding.	Loans Repaid and Sinking Fund.	Depreciation, Renewal and Reserve Funds.	Gross Receipts. Traffic.	Other.	Total.
Aberdeen	†May 31, 1913	Dec., 1899	E.	27 66	350,000	...	...	350,590	12.599	192,660	157,929	143,468	79,125	1,041	80.166
Accrington	†Mar. 31, 1913	Aug., 1907	,,	10 53	169,675	134,670	35,800	134,525	12,619	116,976	17,694	13,200	27,419	403	27,822
Ashton-u-Lyne	†Mar. 25, 1913	Aug., 1902	...	8 15	130,070	108,099	21,971	108,099	13,203	79,589	28,510	2,150	22,206	285	22,491
Ayr	†May 15, 1913	Sept., 1901	,,	7 49	...	...	...	85,445	11,224	78,933	18,044	14,918	15,626	670	16,296
Birmingham	†Mar. 31, 1913	Jan., 1904	,,	108 32	2,302,001	2,089,194	212,807	1,981,588	18,280	1,874,109	215,084	220,369	574,248	7,318	581,566
Blackburn	†Mar. 25, 1913	Mar., 1899	,,	24 63	408,174	342,474	65,700	334,924	13,512	254,600	167,381	1,000	63,440	3,243	66,683
Blackpool	†Mar. 31. 1913	June, 1899	,,	21 31	453,798	301,796	152,002	301,796	14,115	301,796	114,086	15,126	73,155	1,011	74,166
Bolton	†Mar. 31, 1913	Dec., 1899	,,	47 17	552,208	551,019	1,189	559,107	11,842	338,439	162,580	55,901	135,149	1,313	136,462
Bradford	†Mar. 31. 1913	July, 1898	,,	(h)103 69	1,269,568	982,398	287,170	1,002,566	9,653	607,928	388,335	89,072	280,758	18,345	299,103
Brighton	†Mar. 31, 1913	Nov., 1901	,,	17 15	358,620	279,000	80,715	277,914	16,170	223,556	55,653	6,708	51,780	2,018	53,798
Burnley	†Mar. 31, 1913	Dec., 1901	,,	22 13	388,052	339,125	48,927	231,601	10,450	179,498	56,652	48,212	79,641	249	79,890
Burton-on-Trent	†Mar. 31, 1913	Aug., 1903	,,	9 60	108,632	104,562	4,070	106,225	10,895	50,583	53,979	8,966	14,383	1,304	15,687
Bury	†Mar. 31, 1913	June, 1903	,,	21 14 (b)13 21	407,800	280,775	127,025	283,005	13,365	262,135	42,877	(l)24,571	67,370	284	67,654
Chester	†Mar. 25, 1913	April, 1903	,,	6 35	92,991	82,380	10,611	82,934	12,883	69,727	12,785	2,968	12,272	458	12,730
Chesterfield	†Mar. 31, 1913	Dec., 1904	,,	5 8	95,000	70,500	24,500	69,575	13,642	58,510	11,900	5,031	12,220	474	12,694
Colchester	†Mar. 31. 1913	July, 1904	,,	7 75	70,748	69,555	1,193	69,401	8,743	53,425	17,049	Nil.	10,281	477	10,758
Croydon	†Mar. 31, 1913	June, 1906	,,	19 10	287,689	287,689	Nil	284,847	14,894	230,968	87,264	42,453	90,543	1,921	92,464
Darlington	†Mar. 31, 1913	June, 1904	,,	8 71	107,500	76,263	31,237	76,322	8,587	56,888	19,434	5,726	11,842	334	12,176
Darwen	†Mar. 31, 1913	Oct., 1900	,,	7 13	93,400	86,300	7,100	86,300	12,048	57,330	28,280	7,450	14,244	1,176	15,420
Derby	†Mar. 31. 1913	July, 1904	E.	22 5	...	...	...	242,785	11,004	157,213	85,572	(a)4,486	E46,820	1,030	47,850
			H.		...	...	...	...	...	...	...	...	H 394	22	416
Doncaster	†Mar. 31, 1913	June, 1902	E.	12 42	...	...	..	99,172	7,918	80,400	14,741	780	19,928	334	20,262
Dundee	†May 15, 1913	July, 1900	,,	27 38	(f)	345,450	...	352,663	12,835	262,038	83,411	71,823	63,395	1,650	65,045
East Ham	†Mar. 31. 1913	June, 1901	,,	14 32	190,643	190,242	401	191,583	13,307	148,515	58,075	5,097	57,050	610	57,660
Exeter	†Mar. 31, 1913	April, 1905	,,	7 0	106,000	86,111	19,889	86,111	12,301	69,376	17,209	5,915	16,748	Nil	16,748
Gloucester	†Mar 31. 1913	April, 1904	,,	15 0	191,000	144,243	46,757	147,692	9,846	111,051	16,816	750	16.177	1,168	17,345
Halifax	†Mar. 31, 1913	June, 1898	,,	54 70	449,263	412,876	36,387	414,246	7,549	299,480	105,948	27,379	104,947	1,026	105,973
Ilford	†Mar. 31. 1913	Mar., 1903	,,	11 28	149,633	149,633	Nil	149,500	13,171	109,912	39,721	5,611	24,361	2,407	26,768
Ilkeston	†Mar. 31. 1913	May, 1903	,,	3 60	64,214	47,000	17,214	47,883	12,769	42,500	13,660	Nil	6,006	58	6,064
Ipswich	†Mar. 31. 1913	Nov., 1903	,,	14 70	116,471	114,300	2,171	114,838	7,720	98,858	16,305	8,180	22,575	829	23,404
Keighley	†Mar. 31. 1913	Oct., 1904	,,	6 9	50,934	47,328	3,606	47,328	7,745	32,468	16,961	942	8,845	313	9,158
Kilmarnock	†May 15. 1913	Dec., 1904	,,	5 47	65,000	52,625	12,375	53,191	9,519	44,766	7,379	4,017	8,543	248	8,791
Kirkcaldy	†May 15. 1913	Feb., 1903	,,	8 45	213,000	96,748	116,252	96,749	11,025	80,333	16,415	4,161	15,712	494	16,206
Lancaster	†Mar. 31. 1913	Jan., 1903	,,	4 65	60,000	51,550	8,450	43,432	9,022	36,200	13,838	3,000	5,437	143	5,580
Leith	†May 15. 1913	Aug., 1905	,,	17 73	275,000	237,300	37,700	236,155	14,572	186,500	50,800	514	34,664	1,030	35,694
Leyton	†Mar. 31, 1913	Dec., 1906	,,	18 40	306,427	306,371	56	295,376	15,966	249,165	48,876	3,445	68,809	1,558	70,367
Lincoln	†Mar. 31, 1913	Nov., 1905	S.	2 77	98,519	44,947	53,572	44,992	15,187	42,893	9,862	a) 1,600	6,717	128	6,845
Liverpool	Dec. 31. 1913	Nov., 1898	E.	119 0	...	...	...	2,024,706	17,014	1,177,384	1,091,771	428.318	677,881	13,018	690,899
Lowestoft	†Sep. 30, 1913	July, 1903	,,	4 6	96,230	89,912	6,318	89,912	22,064	76,283	15,231	...	11,365	296	11,661
Maidstone	†Mar. 31. 1913	July, 1904	,,	7 3	82,932	82,582	350	79,098	11,239	67,191	15,391	Nil.	9,761	535	10,296
Manchester	†Mar. 31. 1913	June, 1901	,,	188 30	2,355,689	2,034,371	321,318	2,061,791	10,945	1,543,504	437,305	479,683	876,023	11,624	887,647
Nelson	†Mar. 31. 1913	Feb., 1903	,,	3 69	38,000	37,832	168	37,832	9,795	30,118	7,714	...	10,240	51	10,291
Newport (Mon.)	†Mar. 31, 1913	April, 1903	,,	14 28	219,250	196,250	23,000	193,191	13,463	164,763	31,487	9,095	37,555	995	38,550
Nottingham	†Mar. 31, 1913	Jan., 1901	,,	37 40	730,300	725,945	4,355	638,005	17,479	426,818	217,041	64,242	164,746	2,404	167,160
Oldham	†Mar. 25. 1913	May, 1902	,,	28 6 (b) 8 31	516,923	440,204	76,719	442,174	15,750	320,725	118,217	2,135	108,003	2,574	110,577
Perth	†May 15, 1913	Nov., 1905	,,	6 60	90,000	78,350	11,650	78,629	11,649	63,340	15,489	1,673	8,761	509	9,270
Plymouth	†Mar. 31, 1913	Sept., 1899	,,	15 0	...	189,512	...	219,417	14,628	90,925	37,826	17,550	37,925	1,123	39,048
Pontypridd	†Mar. 31. 1913	Mar., 1905	,,	8 48	136,019	135,919	100	137,148	15,946	109,757	26,052	Nil	21,580	313	21,893
Rawtenstall	†Mar. 31, 1913	May, 1909	,,	15 71	193,290	181,526	11,764	181,776	14,442	162,451	19,075	3,177	25,410	1,126	26,536
Rochdale	†Mar. 31. 1913	May, 1902	,,	(i) 40 2	356,991	347,782	9,209	353,066	15.401	347,782	83,475	5,904	80,058	287	80.345
Rotherham	†Mar. 31, 1913	Jan., 1903	,,	12 2	...	...	...	162,504	13,542	144,850	27,250	21,203	40,232	26	40,258
			R.T	...	...	...	...	...	...	...	...	...	2,457	Nil	2,457
Salford	†Mar. 31. 1913	Oct., 1901	E.	75 64	1,050,666	723,669	326,997	723,672	9,599	536,791	258,977	45,699	260,365	486	260,851
Southampton	†Mar. 31. 1913	Jan., 1900	,,	18 35	276,755	252,164	24,591	255,154	13.974	170,637	79,732	12,595	64,186	2,348	66,534
Southend-on-Sea	†Mar. 31. 1913	July, 1901	,,	11 49	130,000	129,961	39	143,808	12,384	116,940	12,784	3,045	34,453	465	34,918
Southport	†Mar. 31. 1913	July, 1900	,,	(d) 10 63	292,000	196,500	95,500	118,708	11,004	153,530	42,970	442	16,928	386	17,314
South Shields	†Mar. 31, 1913	Mar., 1906	,,	10 21	251,883	174,936	76,947	172,476	16,806	150,228	30,818	20,838	33,654	498	34,152
Staly'ge, H., M., D.	†Mar 31. 1913	May, 1904	,,	27 57	325,270	274,990	44,280	279,778	10,096	224,700	56,290	500	34,961	677	35,638
Stockport	†Mar. 31. 1913	Aug., 1901	,,	27 5	305,028	217,804	87,224	251,508	9,145	167,300	67,199	33,552	(n 62,979	1,198	64,178
Sunderland	†Mar. 31. 1913	Aug., 1900	,,	20 28	308,699	303,211	5,488	305,234	14,999	182,318	111,943	31,883	68,507	364	68,871
Wallasey	†Mar. 31. 1913	Mar., 1902	,,	19 69	198,167	195,290	2,877	215,424	10,846	167,924	58,733	11,927	57,458	564	58,022
Walsall	†Dec 31. 1913	Dec., 1902	,,	19 44	188,145	188,100	45	183.351	9,378	159,561	58,366	33.873	32,991	682	33,673
Walthamstow	†Mar 31, 1913	June, 1905	,,	12 42	198,000	180,000	18,000	173,241	13,851	160,982	19,018	4,687	37,191	785	37,976
Warrington	†Mar. 31, 1913	April, 1902	,,	9 52	103,674	102,896	778	102,128	10.583	73,830	29,068	10.000	22.903	302	23,205
West Ham	†Mar. 31. 1913	Feb., 1904	,,	30 4	563,478	551,463	12,015	556.878	18,532	539,650	90,402	40,352	137.766	676	138,442
Wigan	†Mar. 31. 1913	April, 1901	,,	(k) 34 42	...	...	...	...	...	...	...	...	71,268	1,515	72,783
Wolverhampton	†Mar. 31, 1913	April, 1902	S.	21 40	279,733	265,616	14,117	278.615	12,959	217,882	47,734	50,220	53,963	797	54,760
Yarmouth (Gt.)	†Mar. 31, 1913	June, 1902	E.	14 32	144,500	119,750	24,750	121,899	8,465	111,450	22,737	6.070	23.625	508	24,133

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast	†Mar. 31, 1913	Nov., 1905	E.	98 54	1,567,674	1,386,232	181,442	1,389,713	14,037	1,381,200	144,342	117.769	250,589	3.788	254,377
Bexley	†Mar. 31, 1913	Oct., 1903	,,	6 42	99,942	97,387	2,555	96,927	14,912	76,492	20,895	959	13,654	(o)1,542	15,196
Birkenhead	†Mar. 31. 1913	Feb., 1901	,,	24 7	375,848	364,854	10,994	366,610	15,220	247,012	117,863	18,070	61.202	4.365	65,567
Bournemouth	†Mar. 31. 1913	July, 1902	,,	(e) 29 62	449,027	...	...	435,788	19,500	221,797	134,815	13,733	95,695	317	96,012
Cardiff	†Mar. 31. 1913	May, 1902	,,	31 66	818,573	787,292	19,564	783,270	24,612	542,488	244,803	92.968	129.265	21.361	150,626
Coventry	†Mar. 31 1913	Jan.. 1912	,,	15 40	220,538	216,436	4,102	211,298	13,632	216,436	3,287	2,876	38,996	157	39,153
Glasgow	†May 31, 1913	Oct., 1898	,,	193 47 (b) 2 52	3,714,266	3,553,584	160,682	3,694,143	18,595	2,479,408	1,074,177	2,079,645	1,007,653	3,891	1,011,544
Huddersfield	†Mar. 31, 1913	Feb., 1901	,,	46 0	646,284	407,142	239,142	417,408	9.074	255,177	161,349	19,132	106.586	3.123	109,709
Hull	†Mar. 31. 1913	July, 1899	,,	30 44	677,673	541,871	135,802	542.371	17.753	527,641	147,925	125,407	157.048	1.393	158,441
Leeds	†Mar. 31. 19 3	Aug., 1897	,,	112 62	1,603,455	1,546,422	57,033	1,511,588	13,406	1,220,041	482,698	4,637	407.552	3.979	411,531
Leicester	†Dec. 31. 1913	May, 1904	,,	37 0	929,120	727,405	201,715	739,982	19,999	602,478	129,807	100,000	147,458	17.059	164,517
London	†Mar. 31, 1913	...	H.	15 70	(c)	(c)	(c)	...	...	...	...	...	37.544	879	38,423
		May, 1903	C.E	272 40				12,268,035	...	11,734,060	2,515,747	906,796	2,143.559	69,748	2,213,307
N'castle-on-Tyne	†Mar. 31. 1913	Dec., 1901	E.	61 0	1,522,010	1,251,047	270,963	1,234,080	20.230	939,120	383,921	119,407	228.091	10,114	238,205
Northampton	†Mar. 31. 1913	July, 1904	,,	9 13	239,800	127,255	112,545	135,481	14,786	91,176	36,078	10,499	27,250	899	28,149
Portsmouth	†Mar 31. 1913	Sep., 1901	,,	30 66	662,280	698,319	...	712,792	23.118	647,489	234,258	94,934	108 087	1.745	109,832
Preston	†Mar. 31, 1913	June, 1904	,,	17 16	224,102	187,270	36,832	187,269	10.888	119,790	42,091	36.841	42.964	306	43,270
Reading	†Mar. 31. 1913	July, 1903	,,	13 14	235,000	234,000	1,000	229.372	17.409	169,642	59,896	17,831	32.984	1,020	34,014
Sheffield	†Mar 25. 1913	Sep., 1899	,,	77 67	1,727.596	1,413,980	313,616	1,411.959	18.140	1,067.897	418.292	27.521	358.656	3.189	361,845
Wellington, N.Z.	†Mar. 31, 1913	...	,,	30 7	496,423	496,423	Nil	606,771	20.165	496,423	39,486	109,066	149.446	826	150,272

C—Electric conduit system. E—Electric trolley system. H—Horse lines RT—Railless trolley system. S—Surface contact system.
(a) Accident insurance fund. (b) Additional lines leased and worked. (c) Conferred by Annual Money Act, which limits amount for each financial year. Powers not exercised are lapsed. (d) Not including 8 m. 78 ch. leased lines. (f) Unlimited. (h) Includes 1¼ miles railless trolley route. (i) 17 mi. 8 chn. single track leased.
(k) Not including 10 miles 3 chains single track lines leased. (l) Including Insurance. (n) Includes £114 trackless cars. (o) Includes £1,310 through-running contributions.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Working Expenses.					Gross Profit on Working.	Additions to Gross Profit.	Deductions from Gross Profit.					Net Surplus + or Deficit −
	Traffic.	General.	Repairs & Maintenance.	Power.	Total.			Interest.	Sinking Fund.	Income Tax.	Depreciation & Renewal.	Sundries.	Total.	
Aberdeen	20,710	9,404	5,954	7,138	43,206	36,960	472	6,839	4,661	...	13,407	...	24,907	+ 12,525
Accrington	6,839	1,870	2,102	4,644	15,455	12,367	...	4,000	3,693	127	...	...	7,820	+ 4,553
Ashton-under-Lyne	4,840	1,754	2,118	3,278	11,990	10,501	...	2,727	3,651	485	500	371	7,734	+ 2,767
Ayr	3,486	1,964	1,604	1,989	9,043	7,253	...	1,972	1,943	122	2,041	...	6,078	+ 1,175
Birmingham	160,277	40,898	68,278	100,726	370,179	211,387	11,479	65,672	49,946	...	...	5,896	121,514	+ 101,352
Blackburn	14,863	4,262	12,392	10,999	42,516	24,167	110	5,292	14,909	206	...	...	20,407	+ 3,870
Blackpool	15,992	5,132	9,286	9,272	39,682	34,484	...	(h) 9,184	6,969	...	8,000	...	24,153	+ 10,331
Bolton	29,821	8,646	15,984	19,767	74,213	62,241	1,114	(h) 11,189	17,197	1,095	18,715	219	48,415	+ 14,943
Bradford	83,763	24,458	46,061	46,271	200,553	98,550	4,045	20,735	31,926	3,653	32,921	4,360	93,595	+ 9,000
Brighton	14,309	4,028	12,853	8,316	39,506	14,292	27	7,800	5,560	...	27	...	13,360	+ 932
Burnley	18,718	5,306	9,525	15,881	49,430	30,460	...	5,662	6,491	893	...	(f) 2,873	15,919	+ 14,541
Burton-on-Trent	5,111	1,322	2,903	2,998	12,334	3,353	...	1,406	1,418	...	1,500	...	4,324	− 971
Bury	14,761	4,349	6,633	8,026	33,769	33,885	337	(h) 7,974	4,824	244	...	(m) 11,608	24,650	+ 9,572
Chester	3,349	1,574	878	2,203	8,004	4,726	93	(h) 2,761	1,018	..	1,040	...	4,819	...
Chesterfield	2,739	1,230	1,912	2,110	7,991	4,703	253	2,287	1,849	...	...	...	4,136	+ 820
Colchester	2,825	1,189	1,771	2,508	8,293	2,465	48	(h) 2,159	2,319	...	...	...	4,478	− 1,965
Croydon	29,571	6,806	13,300	16,541	66,218	26,246	907	7,994	7,428	1,145	...	...	16,567	+ 10,586
Darlington	4,192	754	1,912	1,945	8,811	3,365	102	2,010	1,966	105	404	59	4,544	− 1,077
Darwen	3,594	831	3,096	2,395	9,916	5,504	141	2,298	2,191	...	1,050	...	5,539	+ 106
Derby	E 16,388 H 631	2,621	4,768 73	8,200 ...	31,977 704	15,873 def. 288	547	6,388	3,363	...	310	(l) 300	10,361	+ 6,059
Doncaster	4,364	1,156	4,698	3,561	13,779	6,483	84	2,876	1,737	...	664	...	5,277	+ 1,290
Dundee	16,477	5,607	7,122	10,216	39,422	25,623	...	8,606	6,020	233	9,254	...	24,113	+ 1,510
East Ham	17,280	6,330	11,722	10,072	45,404	12,256	...	(h) 5,806	6,725	...	...	454	12,985	− 729
Exeter	4,511	1,175	1,311	3,499	10,496	6,252	...	(h) 2,347	1,814	48	...	...	4,209	+ 2,043
Gloucester	6,891	1,687	3,200	1,914	13,782	3,563	...	(h) 4,502	2,772	...	750	...	8,024	− 4,461
Halifax	27,116	8,306	15,263	18,976	69,661	36,312	51	10,159	10,562	...	6,701	1,760	29,182	+ 7,181
Ilford	9,482	2,424	4,116	4,279	20,301	6,467	557	4,894	4,146	...	...	...	9,040	− 2,016
Ilkeston	2,057	614	2,497	1,308	6,476	def. 412	524	1,748	1,694	..	...	(i) 412	3,854	− 3,330
Ipswich	8,072	1,827	4,015	3,502	17,416	5,988	...	(h) 3,642	2,078	...	...	...	5,720	+ 268
Keighley	2,692	768	899	1,612	5,971	3,187	179	1,116	1,881	...	...	(n) 369	3,366	...
Kilmarnock	2,921	599	800	1,633	5,953	2,838	...	(h) 1,623	1,233	3	1,160	28	4,047	− 1,209
Kirkcaldy	4,728	1,158	1,525	2,636	10,047	6,159	...	2,660	1,608	...	410	110	4,788	+ 1,370
Lancaster	2,237	474	872	1,621	5,204	376	80	1,243	1,467	...	...	...	2,710	− 2,254
Leith	9,204	2,631	4,213	3,468	19,516	16,178	272	(h) 6,343	7,750	15	...	70	14,176	+ 2,274
Leyton	(p) 21,929	6,544	11,592	12,875	52,940	17,427	133	10,048	8,064	...	...	228	18,340	− 780
Lincoln	1,478	625	989	925	4,017	2,828	153	1,529	1,071	...	...	...	2,600	+ 381
Liverpool	180,226	61,361	84,026	121,185	446,798	244,101	24,220	48,971	60,318	...	(d) 54,163	(e) 4,869	168,321	+ 100,000
Lowestoft	3,320	743	1,579	2,685	8,327	3,334	..	(h) 2,499	2,031	...	...	...	4,530	− 1,196
Maidstone	2,405	1,018	1,469	1,903	6,795	3,501	58	2,687	2,243	...	...	32	4,962	− 1,403
Manchester	255,604	83,574	84,879	133,681	557,738	329,909	14,282	55,771	52,394	8,613	96,351	(e 31,062	244,191	+ 100,000
Nelson	2,425	677	1,320	2,006	6,428	3,863	...	1,008	966	...	...	...	1,974	+ 1,899
Newport (Mon.)	10,254	4,009	10,364	7,044	31,671	6,879	808	5,817	4,197	...	...	...	10,014	− 2,327
Nottingham	43,601	15,142	18,684	30,847	108,274	58,886	...	14,349	19,762	...	...	...	34,111	+ 24,775
Oldham	25,759	7,792	18,416	21,470	73,437	37,140	1,474	15,796	11,822	1,099	...	(g) 7,762	36,479	+ 2,135
Perth	3,182	698	418	1,252	5,550	3,720	50	1,523	1,632	3	612	...	3,770	...
Plymouth	8,031	4,161	4,322	7,905	24,419	14,629	1,257	4,793	3,932	...	4,465	...	13,190	+ 2,696
Pontypridd	5,017	1,395	5,476	3,196	15,084	6,809	1,754	(k) 4,009	4,160	...	...	39	8,208	+ 386
Rawtenstall	5,415	2,133	3,445	4,113	15,106	11,430	(q) 1,612	5,947	6,113	...	...	...	12,060	+ 982
Rochdale	18,354	4,363	8,535	10,746	41,998	38,347	7,594	11,454	9,594	700	1,382	(z) 9,483	32,613	+ 13,328
Rotherham	E 9,212 RT 557	2,778 273	5,711 633	8,591 369	26,292 1,832	13,966 625	...	4,918 73	3,261 ...	...	5,037 ...	...	13,216 73	+ 750 + 552
Salford	73,745	17,785	22,183	47,371	161,084	99,767	5,659	18,749	21,887	2,522	12,867	(k) 27,401	83,426	+ 22,000
Southampton	19,408	5,269	10,092	12,280	47,049	19,485	9,151	7,290	7,241	565	5,000	1,422	21,518	+ 7,118
Southend-on-Sea	8,046	2,260	3,534	6,187	20,027	14,891	4,228	(k) 3,834	1,753	...	4,017	..	9,605	+ 9,514
Southport	4,428	2,140	2,662	3,263	12,493	4,821	6,362	6,513	5,017	...	1,977	628	14,135	− 2,552
South Shields	7,929	3,263	2,659	5,370	19,221	14,931	313	(h) 5,488	3,438	...	...	...	8,926	+ 6,318
Staly'dge, H., M., D.	12,148	4,018	6,273	6,445	28,884	6,754	...	(u) 7,711	7,308	...	327	532	15,878	− 9,124
Stockport	13,876	3,520	6,852	5,929	30,179	33,998	1,197	5,639	8,701	1,053	2,698	5,602	23,696	+ 11,500
Sunderland	18,431	4,552	4,670	11,268	38,921	29,950	252	(h) 7,228	10,366	476	7,132	...	25,202	+ 5,000
Wallasey	17,249	4,326	5,695	10,660	37,930	20,092	316	5,522	4,559	...	634	...	10,715	+ 9,693
Walsall	8,019	3,201	4,678	5,710	21,608	12,065	1,371	5,191	3,439	458	1,868	...	10,956	+ 2,480
Walthamstow	14,751	2,646	6,717	8,175	32,289	5,707	210	(h) 6,085	2,698	...	...	...	8,783	− 2,866
Warrington	5,529	1,779	4,255	3,235	14,798	8,407	408	2,580	3,254	...	...	...	5,834	+ 2,981
West Ham	51,254	11,253	26,921	19,386	108,814	29,628	508	19,511	12,369	685	...	959	33,524	− 3,386
Wigan	...	...	...	...	41,318	31,465	...	13,859	12,391	...	...	3,781	...	...
Wolverhampton	12,259	4,157	7,334	6,778	30,528	24,232	(x) 1,131	7,788	5,146	100	4,915	(a) 3,637	21,586	+ 3,777
Yarmouth (Gt.)	7,443	1,867	2,634	4,388	16,332	7,801	95	(h) 4,094	2,740	...	...	...	6,834	+ 1,062

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast	73,836	13,642	32,519	23,887	143,884	110,492	1,363	45,900	24,541	2,023	13,000	1,628	87,092	+ 24,763
Bexley	3,455	1,011	2,332	1,167	(s) 10,118	5,078	40	2,850	2,410	...	242	...	5,502	− 584
Birkenhead	16,099	4,011	10,380	9,371	39,861	25,706	86	(h) 11,537	9,501	269	4,302	183	25,792	...
Bournemouth	22,307	6,912	9,107	13,967	52,293	43,719	723	10,733	15,371	...	...	(e) 8,017	34,121	+ 10,321
Cardiff	37,582	(c) 11,176	15,351	20,184	84,293	66,333	1,732	24,138	22,801	800	6,946	...	54,685	+ 13,380
Coventry	10,112	4,289	6,952	2,765	24,118	15,035	2,950	10,379	6,163	...	1,258	...	17,800	+ 185
Glasgow	305,400	122,812	142,988	48,147	619,347	392,197	58,631	81,774	97,077	13,388	215,757	9,829	417,825	+ 33,003
Huddersfield	26,892	6,064	22,638	9,933	65,527	44,182	61	(h) 11,749	10,904	1,630	..	...	24,283	+ 19,960
Hull	47,495	12,212	42,005	11,245	112,957	45,484	1,500	16,730	12,201	1,500	(u) 3,118	...	33,549	+ 13,435
Leeds	109,413	36,055	39,894	28,455	213,817	197,714	7,511	42,197	49,923	5,021	41,752	4,957	143,850	+ 61,375
Leicester	54,257	10,405	21,566	23,887	110,115	54,402	3,763	23,541	12,453	2,122	7,636	2,413	48,165	+ 10,000
London	H 19,064 E 742,157	4,670 (r) 185,634	6,592 312,395	(m) 22,122 220,042	52,448 1,460,228	def. 14,025 753,079	33,397	342,645	388,042	28,188	497	(l) 27,104	786,476	...
N'castle-on-Tyne	64,493	18,675	25,944	19,908	129,020	109,185	3,966	30,431	39,556	3,179	..	6,796	79,962	+ 33,189
Northampton	7,254	3,080	2,489	3,563	16,386	11,763	279	3,481	4,312	323	...	(b) 1,226	9,342	+ 2,700
Portsmouth	28,918	10,200	7,877	5,231	52,226	57,606	8,831	20,875	17,462	964	8,412	350	48,063	+ 18,374
Preston	10,781	4,592	6,263	2,429	24,065	19,205	...	3,933	4,891	..	3,649	1,358	13,831	+ 5,374
Reading	8,837	3,702	3,648	3,358	19,545	14,469	...	6,714	4,662	291	...	...	11,667	+ 2,802
Sheffield	113,235	22,312	43,656	28,487	207,690	154,155	3,057	35,616	40,663	3,786	30,187	213	110,465	+ 46,748
Wellington, N.Z.	56,296	7,242	21,330	16,260	101,128	49,144	2,664	19,961	4,778	..	14,068	4,702	43,509	+ 8,299

(a) Includes £4,893 loss on motor omnibuses. (b) Includes £500 loss on omnibus account. (c) Includes £1,611 insurance fund. (d) Includes reserve.
(e) Includes rents for leased lines. (f) £2,061 rent of leased lines. (g) Includes rents of lines and deficit 1912. (h) Including income tax. (i) Loss on working.
(k) Includes rents of lines. (l) Including loss on horse traction. (m) Horsing expenses. (n) Transferred to motor omnibus capital account.
(p) Includes £396 horse account. (q) Aid from rates £1,500. (r) Including special charges, £5,911. (s) Includes £2,158 through-running contributions to L.C.C.
(u) District fund widening streets. (w) Amount apportioned to leased lines. (x) Includes £306 profit on motor char-a-banc.
(z) Includes £6,469 rent of leased lines.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Appropriation of Net Surplus.			Receipts per Car Mile.		Operating Expenses per Car Mile.					Percentage of Operating Expenses to Total Revenue.	Average Operating Expenses per Car Mile (excludi'g Power Costs).	Board of Trade Units.		
	Carried Forward.	Reserve.	Contribution to Rates or Municip'l Funds.	Average Total per Car Mile.	Average Traffic per Car Mile.	Traffic.	General.	Repairs and Maintenance.	Power. (Price paid)	Total.			Units.	Cost per Unit.	Units used per car mile.
				d.	d.	d.	d.	d.	d.	d.	%	d.		d.	
Aberdeen ...	...	12,525	...	11·06	10·92	2·859	1·298	·822	·985	5·964	53·89	4·979	2,110,964	·81	1·21
Accrington ...	460	3,359	724	12·57	12·38	3·09	·84	·95	2·10	6·98	55·55	4·88	907,721	1·24	1·70
Ashton-u-Lyne	...	...	1,000	11·682	11·534	2·514	·911	1·100	1·703	6·228	53·31	4·525	622,183	1·25	1·346
Ayr...	...	1,175	...	10·13	9·713	2·16	1·23	·99	1·24	5·62	55	4·35	378,570	1·26	·98
Birmingham ...	...	45,000	56,352	10·62	10·492	2·929	·747	1·248	1·840	6·764	63·6	4·924	21,594,889	1·119	1·64
Blackburn ...	3,870	...	...	14·02	13·34	3·12	·90	2·61	2·31	8·94	56·84	6·63	2,030,535	1·3	1·81
Blackpool ...	...	2,667	7,664	16·93	16·71	3·64	1·17	2·12	2·12	9·05	53·50	6·95	1,400,209	1·587	1·33
Bolton	443	...	14,500	11·558	11·447	2·525	·733	1·354	1·674	6·286	54·915	4·612	4,315,448	1·1	1·52
Bradford	...	...	9,000	12·021	11·314	3·366	·983	1·859	1·860	8·068	67·051	5·687	11,126,989	1	1·863
Brighton	932	...	...	11·545	11·112	3·071	·864	2·758	1·785	8·478	73·43	6·693	1,663,126	1·2	1·49
Burnley	...	5,791	8,750	13·226	13·185	3·098	·878	1·577	2·630	8·183	61·85	5·55	3,079,155	1·214	2·11
Burton-on-Trent	...	...	...	8·61	7·90	2·81	·73	1·45	1·42	6·41	78·7	4·99	515,622	1·39	1·01
Bury	...	(i) 4,572	5,000	10·22	10·04	2·214	·685	1·152	1·290	5·341	49·91	4·051	2,039,011	1·081	1·271
Chester	...	...	...	8·81	8·50	2·32	1·09	·61	1·52	5·54	63	4·02	385,132	1·33	1·11
Chesterfield ...	...	820	...	10·51	10·12	2·27	1·02	1·58	1·75	6·62	62·9	4·87	405,096	1·25	1·39
Colchester ...	...	...	...	7·98	7·627	2·096	·882	1·313	1·86	6·151	76·74	4·291	401,208	1·5	1·24
Croydon	...	7,586	3,000	8·381	8·207	2·763	·637	1·224	1·499	6·123	70·91	4·497	2,484,993	1·604	·938
Darlington ...	...	...	...	7·651	7·441	2·633	·480	1·202	1·222	5·537	72·36	4·315	466,784	1	1·222
Darwen	106	...	...	14·218	14·204	3·771	·783	2·833	2·396	9·783	64·30	7·387	...	...	...
Derby	6,059	...	...	E 9·884	9·671	3·385	·541	·985	1·694	6·605	66·8	4·911	1,357,232	1·45	1·168
				H. 5·649	5·347	8·564	...	·994	...	9·558	169·4	...	...	...	...
Doncaster ...	...	1,290	...	9·41	9·25	2·03	·54	2·18	1·65	6·40	69·1	4·75	683,651	1·25	1·32
Dundee	...	10	1,500	11·480	11·189	2·908	·989	1·257	1·803	6·957	60·6	5·154	2,451,897	1	1·803
East Ham ...	...	...	...	10·06	9·95	3·02	1·10	2·04	1·76	7·92	78·8	6·16	2,139,401	1·125	1·55
Exeter	...	2,043	...	9·272	9·272	2·498	·650	·726	1·937	5·811	62·67	3·874	516,793	1·625	1·192
Gloucester ...	...	...	...	6·618	6·173	2·630	·644	1·255	·730	5·259	79	4·529	480,442	1	·73
Halifax	...	...	7,181	11·816	11·702	3·023	·926	1·702	2·116	7·767	65	5·65	3,900,902	1·125	1·81
Ilford	...	...	...	7·616	7·464	2·698	·689	1·171	1·218	5·776	76·4	4·558	960,866	1·07	1·098
Ilkeston	...	...	...	6·727	6·661	2·281	·681	2·77	1·451	7·183	106·79	5·732	326,198	1	1·50
Ipswich	268	...	...	8·408	8·110	2·900	·657	1·442	1·258	6·257	74·41	4·999	672,411	1·25	1·007
Keighley	...	...	...	9·064	8·754	2·664	·761	·890	1·595	5·910	65	4·315	254,636	1·5	1·05
Kilmarnock ...	...	...	...	7·09	6·89	2·357	·482	·646	1·317	4·802	66·3	3·487	313,550	1·25	1·06
Kirkcaldy ...	1,370	...	...	8·22	7·97	2·398	·587	·774	1·337	5·096	63·95	3·75	632,581	1	1·337
Lancaster ...	...	...	...	7·92	7·61	3·130	·664	1·221	2·269	7·284	91	5·015	228,902	1·7	1·33
Leith	2,274	...	...	9·07	8·81	2·34	·67	1·07	·88	4·96	54·67	4·08	899,191	·92	·95
Leyton	...	...	...	9·368	9·161	(c) 2·920	·871	1·543	1·714	7·048	75·092	5·374	2,911,345	1·037	1·615
Lincoln	381	...	...	10·24	10·05	2·21	·94	1·47	1·38	6·00	58·7	4·62	183,807	1·25	1·107
Liverpool ...	...	...	100,000	12·34	12·10	3·217	1·096	1·500	2·164	7·977	63·2	5·813	23,928,396	1·138	1·78
Lowestoft ...	...	...	...	8·5	8·3	2·50	·56	1·2	2·0	6·26	71·58	4·26	368,242	1·75	1·1
Maidstone ...	...	...	...	8·36	7·93	1·96	·82	1·19	1·55	5·52	69·58	3·97	365,309	1·25	1·236
Manchester ...	...	...	100,000	11·351	11·202	3·269	1·069	1·085	1·709	7·132	62·83	5·423	30,492,127	1·046	1·625
Nelson	1,889	...	...	12·29	12·23	2·89	·81	1·58	2·39	7·67	62	5·28	240,804	2	1·2
Newport (Mon.)...	...	...	...	9·557	9·310	2·542	·994	1·570	1·746	7·852	82·26	6·106	1,239,245	1·28	1·28
Nottingham ...	...	5,775	19,000	11·50	11·34	3·00	1·05	1·29	2·11	7·45	64·19	5·39	5,761,096	1·25	1·65
Oldham	...	2,135	...	12·946	12·645	3·016	·912	2·156	2·514	8·598	66·41	6·084	3,435,211	1·49	1·675
Perth	...	...	...	8·79	8·31	3·02	·66	·39	1·19	5·26	59	4·07	277,474	1·08	1·09
Plymouth ...	...	...	2,696	11·790	11·094	2·349	1·217	1·264	2·312	7·142	62·53	4·830	1,139,761	1·667	1·38
Pontypridd ...	355	...	...	12·16	11·99	2·78	·78	3·04	1·78	8·38	68·89	6·6	613,719	1·25	1·42
Rawtenstall ...	...	982	...	11·49	11·01	2·35	·92	1·49	1·78	6·54	56·69	4·76	734,781	1·38	1·33
Rochdale	7,423	5,904	...	11·019	10·980	2·524	·610	1·193	1·550	5·887	52·3	4·327	2,566,554	1·005	1·553
Rotherham ...	E. ...	...	750	12·50	12·50	2·86	·86	1·77	2·67	8·16	65·31	5·49	1,499,517	1·375	1·94
	R.T 552	...	...	10·36	10·36	2·35	1·15	2·66	1·56	7·72	74·56	6·16	64,520	1·375	1·13
Salford	...	...	22,000	10·692	10·673	3·023	·729	·909	1·942	6·603	62	4·661	9,260,898	1·227	1·600
Southampton ...	7,118	...	...	10·411	10·044	3·037	·825	1·579	1·921	7·362	71	5·441	2,000,301	1·5	1·31
Southend-on-Sea	2,514	1,000	6,000	13·14	12·97	3·03	·85	1·33	2·33	7·54	57·35	5·21	848,538	1·75	1·33
Southport ...	...	...	...	9·595	9·381	2·454	1·186	1·475	1·808	6·923	72·1	5·101	513,285	1·5	1·185
South Shields ...	(d) 500	4,218	1,600	10·066	9·919	2·253	·885	·729	1·566	5·433	56·28	4·077	914,188	1·407	1·122
Stalybridge, &c.	...	...	...	7·880	7·729	2·686	·887	1·387	1·425	6·385	81·33	4·960	1,719,656	·9	1·584
Stockport ...	...	250	11,250	10·77	10·57	2·323	·592	1·152	·996	5·063	47·02	4·067	1,897,114	1·069	1·327
Sunderland ...	...	...	5,000	11·208	11·149	2·999	·741	·760	1·834	6·334	55·81	4·50	1,764,971	1·5	1·19
Wallasey ...	...	2,500	7,500	11·035	10·928	3·280	·823	1·083	2·028	7·214	65·3	5·18	1,827,115	1·4	1·45
Walsall	1,480	...	1,000	11·234	11·007	2·675	1·068	1·561	1·905	7·209	64	5·304	845 654	1·68	1·176
Walthamstow ...	...	...	...	7·92	7·76	3·07	·55	1·40	1·71	6·73	84·97	5·02	1,426,964	1·375	1·24
Warrington ...	1,481	...	1,500	12·398	12·237	2·954	·950	2·273	1·728	7·906	64 611	6·177	517,587	1·50	1·152
West Ham ...	...	...	...	9·43	9·329	3·554	·761	1·823	1·313	7·451	78	6·038	6,103,884	·75	1·72
Wigan	...	...	...	12·05	11·80	...	...	...	...	6·84	56·77	5·09	2,132,384	...	1·471
Wolverhampton ...	...	...	3,777	11·250	11·086	2·518	·854	1·507	1·393	6·272	55·75	4·879	1,620,970	1	1·388
Yarmouth (Gt.)...	1,062	...	...	8·605	8·425	2·655	·666	·938	1·564	5·823	67·93	4·259	655,315	1·60	·974

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

									*					Works Cost.	
Belfast	...	...	24,763	10·27	10·12	2·98	·55	1·31	·96	5·80	56·33	4·83	9,733,420	·589	1·40
Bexley	...	...	...	13·77	12·37	3·19	·73	2·20	1·1	7·22	66·6	6·12	405,140	1·1	1·52
Birkenhead ...	...	...	...	12·075	11·89	3·128	·779	2·016	1·141	7·064	58·49	5·923	2,490,715	·565	2·016
Bournemouth ..	...	10,321	...	12·24	12·20	2·85	·88	1·16	(b) 1·78	6·67	54·46	4·89	2,917,309	·583	1·55
Cardiff	3,980	...	9,400	12·014	11·83	3·449	1 026	1·409	·679	6·563	56	5·884	4,015,405	·438	1·54
Coventry ...	185	...	...	9·451	9·414	2·441	1·035	1·678	·668	5·822	61·6	5·154	1,533,212	·450	1·44
Glasgow	...	...	33,003	10·404	10·364	3·141	1·263	1·471	·495	6·370	57·88	5·875	32,280,346	·358	1·38
Huddersfield ...	...	13,370	6,590	11·04	10·73	2·70	·61	2·28	1·00	6·59	59·73	5·59	5,413,488	·42	2·27
Hull	...	1,435	12,000	9·42	9·33	2·82	·68	2·46	·67	6·63	71·04	5·96	4,855,082	·67	1·31
Leeds	...	...	61,375	11·229	11·120	2·985	·984	1·089	·776	5·834	51·95	5·058	16,461,894	·440	1·807
Leicester	...	...	10,000	9·801	8·785	3·232	·620	1·285	1·423	6·560	66	5·137	7,141,333	·411	1·77
London	...	...	...	H. 8·75	8·53	4·32	1·07	1·50	5·02	11·91	136·50	11·91	...	...	...
				E. 10·04	9·73	3·36	·84	1·42	1·00	6·62	65·97	5·62	138,714,732	·619	2·62
N'castle-on-Tyne	...	21,189	12,000	11·958	11·451	3·238	·937	1·302	1·000	6·477	52·57	5·477	9,426,563	·394	1·972
Northampton ...	500	1,200	1,000	10·55	10·21	2·72	1·15	·93	1·34	6·14	58	4·80	934,809	·91	1·46
Portsmouth ...	11,374	(f) 3,000	4,000	12·229	12·035	3·220	1·136	·877	·582	5·815	47·55	5·233	2,599,210	·543	1·206
Preston	...	5,374	...	10·698	10·50	2·665	1·135	1·550	·600	5·95	55·63	5·35	1,516,545	·384	1·309
Reading	...	2,802	...	8·920	8·650	2·319	·970	·957	·880	5·126	57	4·246	1,033,313	7[a]	·99
Sheffield	...	7,032	37,716	10·760	10·665	3·367	·664	1·298	·847	6·176	57·389	5·329	16,500,208	·673	1·837
Wellington, N.Z.	8,299	...	...	15·654	15·568	5·864	·755	2·222	1·694	10·535	67 3	8·841	4,921,406	·80	2·13

* The figures given under "Power" in Table II. include actual works costs only. H—Horse lines. E—Electric trolley system. (b) Including ·88d. per car mile current supplied by Bournemouth and Poole Supply Company. (c) Horse account ·053d. (d) Accident, insurance, and compensation fund. (f) Insurance fund. (i) Including Insurance.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Population Served.	Car Mileage.	Passengers Carried.	Traffic Records. Passengers Carried per Car Mile.	Average Fare per Passenger.	Average Journeys per Head of Populat'n per Annum.	Average Car Miles per Day per Car.	Traffic Revenue per Mile of Single Track.	Average Traffic Revenue per Annum per Head of Populat'n Served.	Operating Expenses per Passenger.	Average Distance of 1d. Fare.	Average Fare Charged per Mile.	Average Speed per Hour.	Average Total Car Hours per Day.	Average Number of Cars in Use Daily.	Number of Cars in Stock.
					d			£		d.	Miles.	d.	Miles.			
Aberdeen ...	165,000	1,738,966	19,990,711	11·49	·95	121·15	105·8	2,930	9/6	·519	1·69	·6	7·5	655	45	77
Accrington ...	70,000	531,356	4,577,019	8·6	1·43	65·3	105	2,572	7/10	·81	1·07	·929	7·5	242	17	27
Ashton-u-L.	50,000	462,060	4,928,282	10·666	1·081	98·565	105	2,712	8/10	·584	1·223	·81	8	190	12	23
Ayr	33,000	385,986	3,880,850	10·05	·96	117	106	2,079	9 6	·558	1·25	·75	8	140	10	20
Birmingham	est.850,000	13,134,642	134,467,166	10·23	1·025	158	81·06	5,298	13/6	·66	2·34	·366	7·5	5,063	485	511
Blackburn ...	200,000	1,141,161	11,721,367	10·88	1·27	58·61	105	2,564	6/4	·87	1·25	·76	7·50	434	31	61
Blackpool ...	67,500	1,050,115	12,452,820	12	1·41	184·48	89·6	4,321	21/8	·765	...	...	8	...	32	72
Bolton ...	221,000	2,831,003	30,287,673	10·69	1·065	137·04	121·66	2,875	12/3	·588	1·468	·627	7·25	1,030	60	106
Bradford ...	354,000	5,971,561	62,005,976	10·383	1·086	175	113	2,703	15/11	·776	1·63	·504	7·3	2,232	144	242
Brighton ...	132,265	1,118,309	11,312,855	10	1·09	85·55	82·83	3,012	7/11	·84	1·27	·788	6·41	544	34	50
Burnley ...	175,000	1,449,647	15,949,359	11	1·18	91	95	3,620	9/1	·744	1·25	·83	7	760	40	57
Burton ...	48,000	437,106	3,188,655	7·30	1·082	66	...	1,684	5/10	·928	1·505	·58	7·5	...	...	20
Bury	128,202	1,599,872	15,132,553	9	1·07	118·03	102·33	1,957	10 6	·535	1·24	·85	8·56	506·64	42·71	54
Chester ...	39,028	346,645	3,067,815	8·85	·96	78·6	95	1,906	6/4	·626	1·27	·8	7	150·60	10·04	18
Chesterfield	38,000	289,748	2,631,398	9·08	1·1	69	122	2,407	6/8	·728	1·38	·75	7·33	126	7	14
Colchester ...	44,160	323,524	1,871,896	5·79	1·32	42·39	89·3	1,295	4/8	1·06	·85	1·09	6·81	157·92	9·87	18
Croydon ...	170,451	2,657,824	20,504,143	7·74	1·06	120·29	125	4,734	10/7	·775	2·15	·50	7·92	915·82	58	75
Darlington ...	58,000	381,920	3,791,835	9·9	·75	65·38	95·1	1,345	4/1	·557	1·219	·45	6·66	151·25	11	16
Darwen ...	40,611	252,710	2,755,011	10·91	1·24	67·83	...	1,989	7/-	·864	...	...	...	...	...	...
Derby ...	124,000	E 1,161,854	10,857,834	9·345	1·035	87·56	...	2,122	7/7	·707	1·44	·75	6·375	...	...	50
		H. 17,674	98,230	5·558	·962			...	...	1·36	1	1	..	...	...	3
Doncaster ...	52,000	816,540	5,072,172	9·81	·952	97·54	103	1,591	7/8	·652	1·25	·76	7·5	218	16	25
Dundee ...	165,000	1,359,821	17,734,162	13·04	·857	107	...	2,305	7/8	·533	2	·50	7·3	...	...	68
East Ham ...	130,000	1,375,433	17,775,698	12·92	·77	132	...	5,101	8·9	·61	1·80	·65	...	...	...	45
Exeter ...	48,660	433,507	4,110,513	9·48	·98	84·48	...	2,392	6/11	·612	1	1	6	...	16	20
Gloucester ...	53,972	628,946	4,200,432	6·7	·92	77	90·75	1,078	6/-	·78	1·5	·65	6·78	260·3	19	30
Halifax ...	176,000	2,152,391	19,456,923	9·04	1·27	110	79·5	1,912	11/11	·86	1·35	·84	6·8	814	74	95
Ilford ...	82,000	843,517	7,578,813	8·79	·831	92·42	...	2,312	5/1	·64	1·543	·69	8	...	...	26
Ilkeston ...	32,000	216,348	1,404,447	6·49	1·26	43·9	95	1,604	3·9	1·106	1·50	·633	7	93	7	13
Ipswich ...	75,300	668,025	5,554,585	8·31	·975	73·76	65·5	1,518	6/-	·75	1·53	·693	6·17	234·19	20·78	36
Keighley ...	43,000	242,500	3,099,272	12·8	·68	72·08	55·35	1,447	4/1	·462	2·22	·45	6·87	126	7	12
Kilmarnock ...	36,000	297,557	2,317,709	7·78	·879	64·38	90·05	1,537	4/8	·616	1·13	·86	7·22	112·58	9·05	14
Kirkcaldy ...	39,600	473,089	5,237,947	11·07	·719	132·27	59	1,786	7/11	·46	1·522	·64	7·5	195	15	22
Lancaster ...	41,414	171,475	1,461,104	8·52	·893	35	75	1,132	2·8	·854	1·71	·5	8	88·2	6·3	12
Leith ...	110,400	944,329	9,706,611	10·28	·87	87·92	125	1,926	6·3	·482	1·32	·72	8·3	311	20·66	37
Leyton ...	124,735	1,802,647	17,476,453	9·69	·945	140	112	3,719	11/-	·727	...	...	8	...	...	60
Lincoln ...	20,000	160,446	1,733,259	10·8	·92	86·66	64·08	2,264	6·8	·556	1·75	·428	7	90	5	8
Liverpool ...	839,000	13,442,605	144,085,927	10·72	1·129	172	77	5,695	16·2	·744	2·514	·39	7·5	4,920	480	595
Lowestoft ...	35,000	315,341	2,613,797	8	1·04	70	72	2,788	6/6	·764	1·5	·7	5·75	192	12	19
Maidstone ...	25,000	295,438	2,224,200	7·528	1·053	88·968	81	1,387	7/1	·73	1	1	6·7	128	12	19
Manchester	950,000	18,768,259	187,675,183	10	1·12	198	95·8	4,990	17/5	·713	2·368	·422	7·25	...	537	629
Nelson ...	45,000	200,996	2,776,785	13·82	·88	61·71	94·09	2,650	4/4	·555	1	1	5·50	108	6	11
Newport ...	87,626	968,067	9,251,181	9·56	·973	105·6	...	2,617	8/7	·821	1·75	...	...	...	37	44
Nottingham	260,000	3,485,789	38,484,032	11·04	1·02	148	92·08	4,514	12/8	·67	1·68	·65	6·86	...	104	135
Oldham ...	180,000	2,049,916	21,435,727	10·457	1·19	119·087	109·5	2,962	12/-	·822	1·115	·884	6·84	820	51·25	92
Perth ...	35,900	252,940	1,813,228	7·16	1·15	50·5	96·25	1,298	4/7	·73	..	..	6·25	120	8	12
Plymouth ...	112,000	820,406	8,839,974	10·77	1·029	78·92	...	2,528	6/9	·663	...	...	...	...	...	42
Pontypridd ...	40,000	432,006	5,047,168	11·68	1·02	126	81·2	2,509	10/9	·71	1·25	·51	6·5	221	17	26
Rawtenstall	50,000	553,813	4,949,775	8·93	1·23	98·72	126	1,600	10/2	·73	1·12	·88	9	198	12	24
Rochdale ...	130,000	1,749,967	13,740,152	7·91	1·38	105·7	114·90	2,008	12/4	·734	1·07	·90	7·66	645	43	69
Rotherham ...	64,000	E 772,610	8,774,539	11·35	1·104	137·12	...	3,352	12/7	·719	...	...	...	...	...	...
	...	R T 56,887	191,088	3·36	3·08	...	...	...	...	2·3	...	...	...	...	...	...
Salford ...	350,000	5,854,830	50,113,120	8·559	1·243	143	111	3,425	14·10	·77	1·85	·55	7·853	2,075·18	144	200
Southampt'n	122,200	1,533,638	12,475,793	8·134	1·235	102	...	3,482	10 6	·90	...	...	...	...	...	70
Southend ...	78,000	637,366	7,581,104	11·89	1·09	97·2	87	4,708	8/10	·634	1·41	·76	6·5	357	21	31
Southport ...	31,312	433,068	4,401,336	10·63	·923	140·5	103	1,574	10/10	·68	1·6	·62	6·66	217·5	13·5	26
So'th Shields	110,513	814,212	8,456,688	10·386	·942	76·5	129·2	3,332	6/1	·515	1·825	·54	7·61	282	16	35
Stalybridge	92,933	1,085,545	8,896,836	8·123	·943	95·7	...	1,280	7/6	·779	1·275	·784	6·8	...	...	60
Stockport ...	120,000	1,429,396	11,544,225	8·0	1·39	96·20	78·32	2,290	10/5·9	·627	1·3	·7	7·5	471	29	53
Sunderland	170,000	1,474,637	16,972,537	11·5	·968	99·8	79·3	3,366	8/1	·550	1·34	·68	7	672	42	70
Wallasey ...	83,000	1,261,855	12,352,000	9·78	1·11	148·94	98·7	2,893	13/10	·99	1·89	·54	7	...	...	61
Walsall ...	100,000	719,372	6,121,381	8·509	1·293	61	86	1,885	6/7	·847	1·24	·79	7	345	23	39
Walth'mst'w	128,000	1,151,029	11,807,549	10·258	·756	91·89	93	2,968	5/11	·655	1·15	·89	7·2	408	36	38
Warrington	86,000	449,206	6,064,139	13·5	·906	70·513	102·533	2,372	5/4	·584	1·246	·803	6·408	192·048	12·003	21
West Ham ...	294,200	3,544,292	40,200,317	11·34	·822	136	98	4,592	9/4	·65	1·80	·56	7·66	1,262·25	99	118
Wigan ...	200,000	1,449,188	13,018,833	8·98	1·314	65·1	105·5	2,309	7/2	·761	1·15	...	7·4	...	42	67
Wolverh'ton	135,000	1,168,239	11,913,122	10·198	1·08	89·25	87	2,510	8/-	·615	1·18	·879	6·85	622·2	36·6	49
Yarmouth ...	55,800	673,027	4,514,871	6·7	1·256	80·91	73·7	1,687	8/6	·868	1·25	·76	7	375	25	35

TABLE II.—TOWNS WITH SEPARATE GENERATIHC STATIONS FOR TRACTION.

Belfast ...	385,492	5,946,659	58,437,942	9·82	1·07	151	128	2,539	13/-	·592	1·96	·43	8·75	2,256	141	282
Bexley ...	16,500	264,864	2,090,533	7·89	1·57	127	130	2,100	16/6½	1·16	1·59	·63	10	17	8	16
Birkenhead	130,832	1,235,277	13,622,361	11·02	1·077	104·12	68·64	2,540	9/4	·702	1·39	·66	6·61	511·73	49·30	59
Bournem'uth	120,000	1,882,054	15,750,576	8·36	1·45	131	95	3,214	16/-	·796	1·19	·87	6·80	1,140	60	81
Cardiff ...	182,729	2,614,901	28,365,277	10·84	1·09	155	98·25	4,062	14/1	·713	1·44	·736	7·5	1,120	70	130
Coventry ...	135,000	994,207	7,639,065	7·7	1·23	57	68	2,516	5·9	·757	1·18	·866	6·4	424	35	41
Glasgow ...	1,150,000	23,335,008	311,480,086	13·348	·776	270·85	105·49	5,139	17·6	·477	2·31	·44	8·13	8,484·59	606·04	843
Huddersfield	160,000	(a) 2,383,858	21,595,569	9·09	1·18	144	120	3,675	13/4	·728	1·39	·70	7·48	868·32	54·27	86
Hull ...	287,032	4,040,739	42,997,226	10·64	·877	149·80	127·10	5,141	10/7	·631	2·75	...	9	1,393·6	87·10	160
Leeds ...	500,000	8,795,465	89,668,185	10·2	1·088	179	113·35	3,594	16/3	(b) ·937	1·95	·539	7·48	3,190	213	232
Leicester ...	230,970	4,028,542	37,073,717	9·202	·954	161	...	3,985	12/9	·712	2·18	·984	8	...	...	150
London ...	...	H 1,086,481	11,550,504	10·93	·78	...	77·12	2,365	...	1·09	...	...	5·85	500·84	38	74
		E 52,886,623	501,102,149	9·48	1·03	..	117·15	7,867	..	·69	...	...	8·82	16,427·36	1,237	1,661
Newcastle ...	300,000	4,780,662	52,204,974	10·92	1·082	174	...	3,738	15/2	·593	1·58	·633	7	...	...	192
Northampt'n	90,793	640,158	6,727,190	10·51	·97	76·53	...	2,974	6 -	·58	1·34	·7	6·91	...	...	26
Portsmouth	241,256	2,155,508	24,520,647	11·37	1·052	101·63	84	3,505	9/-	·511	1·66	·62	7	1,072	72	100
Preston ...	120,000	970,719	9,567,366	9·85	1·06	79·73	132	2,498	7·2	·603	1·01	·95	7·36	...	...	53
Reading ...	76,000	915,180	8,251,274	9·01	·97	108	97	2,505	8 8	·57	1·59	·68	7	352	26	56
Sheffield ...	466,408	8,071,188	96,330,242	11·935	·893	206·535	103·32	4,606	15 5	·517	2·62	·386	7·372	3,103·27	214·019	279
Wellington ...	68,000	2,303,913	23,858,412	11·08	1·40	350	90	4,706	43/11	·94	1·112	·88	7·86	803	70	89

E—Electric trolley system. H—Horse lines. (a) Including 9,417 miles coal haulage. (b) Total expenses per passenger.

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TRAMWAY AND OMNIBUS SHARE LIST.

Specially Compiled for "The Tramway and Railway World."

Amount Ranking for Dividend.	Shares.	Name.	Div'd. Prev. Half-year.	Div'd. Last Half-year.	Quotations, Apr. 4.	Movement Since Mar. 4. Rise.	Movement Since Mar. 4. Fall.	Latest Business Done. Price.	Latest Business Done. Date.	Yield on Buying Price. £ s. d.	Dividend Due. (Final in Italics.)	Quotations, Jan., 1908, to Apr. 4, 1914. Highest	Lowest
640,000	5	Anglo-Argentine Tramways 5½% Cum. 1st Pref.	2/9	2/9	4¼–4⅜	...	— 1/16	4⅜	April 4	5 14 3	Jan., Dec.	5 1/16	4¼
500,000	5	Do. do. 5½% Cum. 2nd Pref.	2/9	2/9	4 3/16–4 5/16	...	— 1/16	87/-	April 2	6 1 3	June, *Dec.*	5 1/16	4 1/16
1,500,000£	...	Do. do. 5% Deb. Stock Red.	5%	5%	96½–98½	...	...	97⅜	April 2	5 1 6	June, Dec.	105½	95½
325,532£	Stk.	Auckland Elec. Trys. Co. 5% Mort. Deb. ...	5%	5%	103–106	...	...	104½	Mar. 18	4 15 3	Jan., July.	107	99½
75,000	1	Bath Electric Tramways 5% Cum. Pref. ...	6d.	6d.	1/16–1/8	...	— 1/16	10/6	Mar. 3	7 5 6	*Jan. & July*	1/8	1/16
334,696£	Stk.	Birmingham Dist. Pow. & Tract. 4½% 1st Deb....	4½%	4½%	84–86	...	— 1	86	Feb. 12	5 5 6	Jan., July.	96	77
15,000	10	Blackpool and Fleetwood Tramways	4/-	13/-	13½–14½	..	— ½	14½	Mar. 31	5 13 6	Feb., Aug.	16	12
60,000	10	Bombay Elec. Supply & Trys. Co. 6% Cum. Pref.	6/-	6/-	10¾–11½	...	...	11	Mar. 11	5 7 3	Feb., Aug.	12	7⅞
1,003,614	$100	Brazil Traction...	6	6	83–85	...	— 6	84	April 4	7 4 9	Fb.My.Ag.Nv.	105½	83½
75,000	5	Brisbane Elec. Tramways Investment Co. Ord.	4/-	4/-	7⅛–8	...	— ⅛	7⅜	April 1	5 0 0	*May*, Oct.	9⅛	3 7/16
75,000	5	Do. do. do. 5% Cum. Pref.	2/6	4/-	4⅛–5⅛	...	...	5⅛	Feb. 17	4 13 0	*May*, Nov.	5⅛	4⅛
50,000	10	Bristol Tramways and Carriage Co.	4	5	6¾–7	...	— ¼	5½	Oct. 29	6 8 9	*Feb.*, Aug.	14½	5
50,000	10	Do. do. do. 4% Cum. Pref.	4	4	6¾–7½	...	— ¼	6⅝	Nov. 21	5 10 6	Jan., July.	9¼	6¾
800,000£	Stk.	British Columbia Electric Railway Def. Ord. ..	8%	8%	117–121	...	— 2	120	April 4	6 12 3	May, Nov.	156	114
800,000£	Stk	Do. do. Pref. Ord.	6%	6%	105–109	...	— 1	107	April 2	5 11 6	Feb., Aug.	132⅛	103
800,000£	Stk	Do. do. 5% Cum. Perp. Pref.	5%	5%	101–104	...	— 2	102⅛	April 2	4 17 3	Jan., July.	114	98½
1,070,097£	Stk.	British Electric Traction Prefd. Ord.	...	...	15⅛–17⅛	...	...	16	April 4	...	Apr., *Oct.*	18	8
403,503£	Stk.	Do. do. 6% Cum. Pref. ..	6%	6%	89–92	...	— 1	91⅛	Mar. 7	6 13 3	Feb., *Aug.*	95¼	73
1,464,245£	Stk.	Do. do. 5% Perp. Deb. ...	5%	5%	93–95xd	...	...	93⅜	April 2	5 5 3	April, Oct.	101	82½
439,796£	Stk.	Do. do. 4½% 2nd Deb. Red. ...	4½%	4½%	79–82	...	...	80½	Mar. 19	5 12 3	May, Nov.	84	58
246,625£	Stk.	Buenos Aires Port & City Trys. 6% 1st Mt. Deb.	6%	6%	73–78	...	...	71	Mar. 24	7 14 0	Feb., Aug.	103	61
623,270£	Stk.	Buenos Ayres Lacroze Trys. Stg. 5% 1st Mt Deb.	5%	5%	100–102	...	...	100⅛	April 1	4 18 0	Mar., Sept.	103	89
137,610	5	Calcutta Tramways Ord.	5/-	2/6	6⅛–6¾	+ ⅛	...	6¼	April 3	5 11 3	*Apr.*, Oct.	7⅛	4
47,295	5	Do. 5% Cum. Pref.	2/6	2/6	5–5⅛	...	...	5⅛	Mar. 18	4 15 3	Jan., July	5⅜	4⅜
491,222	1	Cape Electric Tramways	1/-	for '12	1/16–1/8	...	...	13/3	Mar. 9	6 19 3	Feb., *Nov.*	1/8	1/16
15,000	10	Carthagena and Herrerias Steam Tramways ...	4/-	May, '13	3–3½	...	...	62/6	Mar. 3	5 6 9	April.	7	3
248,000	5	City of Buenos Ayres Tramways (1904) ...	2/6	2/6	5⅛–5⅜	...	...	5⅜	April 3	4 11 0	Fe My.Au.No	6	5⅛
120,000£	Stk.	Colombo Elec. Trys. & Ltg. 5% 1st Mt. Deb. ...	5%	5%	89–93	...	...	90	Jan. 7	5 8 9	May, Nov.	101	87
11,500	10	Cork Electric Tramways and Lighting Co. ...	...	6/- ann.	4⅛–4⅜	...	...	4 3/16	Dec. 23	6 6 6	*Mar.*	10	4⅛
12,327	10	Do. do. do. 5% Cum Pref.	5/-	5/-	6¾–7	...	...	6⅞	Jan. 29	7 13 0	Jan., July	10⅜	6¼
3,000	10	Dublin and Lucan Elec. Railway 5% Cum. Pref.	5/-	Nil	6–7	...	...	9	Aug. 25/10	.	Sep.15, Mar.15	9½	6
60,000	10	Dublin United Tramways Co. (1896), Ltd., Ord.	6/-	5/-	10¾–11½	...	...	11⅛	April 2	4 17 9	Feb., Aug.	14	10¼
60,000	10	Do. do. do. 6% Cum. Pref.	6/-	6/-	12¼–12¾	...	...	12⅜	April 2	4 14 3	*Feb.*, Aug.	14	11⅛
13,500	10	Gateshead & District Trys. Co. Ord.	9/-	5/-	9–9¼	+ ¼	...	9	Jan. 7	8 8 6	*Mar.*, Sept.	9⅜	7⅛
268,235	10/-	Hastings and District Elec. Trys Ord.	...	...	1/2–3/4	...	...	1/9	Jan. 5/12	...	...	1/16	1/32
80,000	1	Do. do. 6% Cum. Pref. ...	6%	6%	1/16–1/8	...	...	12/6	June 6	8 14 6	...	1/8	1/32
125,000£	Stk.	Do. do. 4½% Deb. Stk. Red.	4½	4½	65–70xd	...	...	67½	Feb. 10	6 8 9	April, Oct.	100	67½
$9,634,000	$1,000	Havana Elec. Rly. Co. Con. Mort. 5%	5%	5%	95½–97½	...	...	96½	Dec. 23	5 7 6	Feb., Aug	105	80
195,000£	100	Hong Kong Tramways Co. 5% Mt. Deb. ..	5%	5%	86–90	...	...	87	Feb. 9	5 12 6	May, Nov.	92	75½
20,000	10	Imperial Tramways Ord.	Nil	4% year	3–3½	+ ⅛	...	3	Mar. 4	11 8 9	Feb., Aug.	9¾	2½
20,000	10	Do. 6% Cum. Pref.	...	6% year	6½–6¾	+ ¼	...	6 7/32	Ju. 28/09	8 18 0	Jan., July.	9¾	2¾
30,000	5	Isle of Thanet Elec. Try. & Ltg. Co. 5% Cum. Pref.	2/6	Dec. '12	2–2½	...	...	46/3	Nov. 30/12	6 0 0	*Mar.*, Sept.	3	¾
250,000	1	Kalgoorlie Electric Tramways	...	...	0–1/16	..	...	1/-	Jan. 15/12	...	*May*	1/16	0
170,000	1	La Plata Elec. Trys. Co. 6% Cum. Pref. ...	0/4·65	0/4·80	⅞–1	...	...	17/-	Oct. 14	...	*April*, Oct.	1 1/16	⅛
30,800	10	Lanarkshire Tramways	6/-	6/-	9½–10¼	...	...	10 1/16	Feb. 18	6 2 0	Feb., Aug.	10 1/8	9⅛
250,000£	Stk.	Lancashire United Trys. 5% Prior Lien Deb....	5%	5%	87–89	+ 2	...	88	April 3	5 14 0	Jan., July.	95	76
634,026	1	Lisbon Electric Tramways Ord.	7½d.	7½d.	1 1/16–1 1/8	...	...	22/3	Aug. 25	4 11 6	*July.*	1 3/8	⅛
425,553	1	Do. do. 6% Cum. Pref ...	7½d.	7½d.	1–1⅛	...	...	23/-	Mar. 10	5 6 9	Jan., July.	1½	1/16
1,666,673	1	London and Suburban Traction Ord.	..	...	1/2–3/4	...	— 1/32	4/3	April 4	...	...	1/32	¼
1,316,268	1	Do. do. do. 5% Cum. Pref.	...	5	⅞–1	...	...	12/-	April 4	6 13 6	Feb., Aug.	1 1/16	¼
1,000,000£	Stk.	London General Omnibus 4½% 1st Deb.	4½	4½	97⅛–99½	...	...	99	April 1	4 11 0	Jan., July.	98¼	92½
1,000,000£	Stk.	Do. do. 5% Cum. Income ...	5	5	89–92	...	...	89½	April 3	5 8 9	Feb., Aug.	95	85½
1,619,930£	Stk.	London United Tramways 4% 1st Deb. Stk. ...	4	4	60–64	...	— 3	60	Mar. 28	6 3 0	*Jan.*, July.	82	54½
63,430£	Stk.	Madras Elec. Trys. (1904) Ltd. 5% Deb. Red. ...	5%	5%	101–103	...	...	101½	Oct. 16	4 17 3	Jan., July.	105	86
20,000	5	Do. Do. Do. 6% Cum. Pref. ...	...	...	4⅞–5⅛xd	...	...	5 1/16	Mar. 12	5 14 3	Ma., Sept.	5⅜	87.6
300,000£	100	Manaos Trys. & Ltg. Co. 5% 1st Debs.	5%	5%	79–82	...	...	81	Feb. 20	6 2 0	Jan., July.	97	79
$4,785,000	$1,000	Manila Elec. R. R. and Ltg. Corp. 5% Gld. Bds.	5%	5%	98½–100⅛	...	...	99½	Feb. 24	5 2 0	Mar., Sept.	104⅜	84
60,000	1	Mansfield & District Trys. Ltd. 6% Cum. Pref.	7½d.	7½d.	1/16–1/8	+ ⅛	...	18/6	Sept. 24	5 13 0	Mar., Sept.	1 1/16	⅛
$20,000,000	$100	Mexico Tramways Common Stock	$5½	$5½	73–76	...	...	77	Mar. 28	...	Fb.My.Au.No	151½	61
$3,840,000	...	Michigan Untd Rys. Co. 5% 1st Debs & Refdg Bds	5%	5%	91½–93½	...	...	91⅞	Mar. 9	5 7 0	May, Nov.	101½	89½
600,000£	100	Montreal Street Rly. 4½% Ster. Debs.	4½%	4½%	98–100	...	...	99½	Mar. 2	4 10 0	Fe.My.Au.No.	107	97
150,000	1	National Steam Car	6%	year	⅜–7/16	+ 1/32	...	16 6	April 3	7 7 9	Dec.	39 9	15/-
5,000	10	Oldham, Ashton, and Hyde Elec. Tramways Ord.	5 -	Nil	5¾–6	...	...	7	Apr.2/13	...	Mar., Aug.	9⅜	6⅛
5,000	10	Do. do. do. 5% Cum. Pref.	5%	5%	5¾–6	...	— ⅛	6½	July 8/12	8 6 9	Feb., Aug.	8⅛	6½
77,893	5	Para Elec. Rly. and Ltg. Co., Ord.	5/-	5/-	3⅞–4⅛	...	— 1	4	April 3	11 8 6	May, Nov.	8	4⅞
100,000	1	Perth (W.A.) Electric Tramways Ord.	6d.	7½d.	...	...	..	25/6	Nov. 8/12	...	*Sept.*, Nov.	26/10½	⅛
245,000	1	Potteries Electric Traction Ord.	3½	for '12	⅜–½	...	...	7/6	Mar. 7	7 0 0	April.	½	⅛
245,000	1	Do. do. 5% Cum. Pref. ...	6d.	6d.	11/32–3/8	...	...	11/6	Mar. 25	7 11 6	*Feb.*, Aug	½	1/16
124,560	1	Provincial Tramways Ord.	8d.	1/-	1/16–1/8	+ 1/32	...	19 -	April 2	8 17 9	May. *Nov.*	1 1/16	13/-
10,000	10	Do. do. 6% Cum. Pref.	6/-	6/-	9¾–10¼	...	...	10	Mar. 2	5 17 3	June, *Dec.*	11	9
50,000	5	Rangoon Elec. Trys. & Supply Co. 6% Cum. Pref	3/-	3/-	5–5½	...	...	5	Mar. 12	5 9 3	June, Dec.	6	5
32,000	10	Shanghai Elec. Construction Co.	10 -	year	12¾–13¾	+ ½	...	13	April 2	3 18 6	May.	12½	6
330,400£	Stk.	Singapore Elec. Trys. Ltd., 5% Debs. Red. ...	5%	5%	88–92xd	+ 2	...	89	April 2	5 8 9	Mar., Sept.	91	61
169,570	1	S. Metrop'n Elec. Trys. & Ltg. Co. 6% Cum Pref.	1/2½	May. '13	⅜–½	...	...	15/9	May 16, '12	8 0 0	Feb., Aug.	1⅛	⅜
91,720£	Stk.	Southern Elec. Trys. of B.A., 1st Mt. Deb. ...	5%	5%	95–97	...	— 1⅛	96¼	Mar. 3	5 3 3	Feb., Aug.	100⅜	90
471,500£	100	Toronto Rly. Co. 1st Mt. 4½% Stg. Bonds	4½%	4½%	98–100	+ 2	...	99½	Mar. 18	4 10 0	Feb., Aug.	104	97
80,000	5	United Elec. Tramways of Monte Video, Ord ...	3/-	4/-	4⅜–5⅛	..	— ⅛	5 1/16	Feb. 27	6 16 9	*June*, Dec.	6⅛	4⅜
90,000	5	Do. do. do. 6% Cum. Pref.	3/-	3/-	4⅛–5⅛	...	...	98/9	Mar. 20	5 14 3	June, Dec.	6⅜	4 5/16
500,000£	Stk.	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Debs.	4½%	4½%	93½–95½	...	— 1½	94¼	April 4	4 16 6	Apr., Oct.	109⅛	94½
40,977	5	Yorkshire (West Riding) Elec. Trys. Ord. ...	...	...	⅜–½	...	...	7/6	Feb. 4	...	*Mar.*	1⅛	⅜
46,261	5	Do. do. do. 6% Cum. Pref.	1/6	2/6	4–4½	+ ¼	...	87/6	Mar. 12	4 9 0	*Mar.*	4	1¾

ELECTRIC RAILWAY SHARES.

1,854,720£	Stk.	Central London Ord. Stock (4% Guar.)	...	4	81–83	...	...	82½	April 3	4 16 6	*Feb.*, Aug.	89⅛	59⅜
572,640£	Stk.	Do 4% Guar. Pref. Stock ...	4	4	82–84	...	...	83	April 4	4 15 3	Feb., Aug.	92	80
572,640£	Stk.	Do. Deferred Stock (4% Guar) ...	..	4	79–81	...	— 1	80	April 2	4 18 9	Feb., Aug.	91⅜	42
50,000	10	Liverpool Overhead Ord.	2 6	3.6	4¼–4½	...	— ¼	87/6	April 2	6 13 6	*Feb.*, Aug.	4⅜	⅜
1,412,263£	Stk.	Mersey Cons. Ord. Stock	Nil	Nil	6½–7	+ ½	...	6	Mar. 31	...	*Feb.*, Aug.	8	1
5,732,062£	Stk.	Metropolitan Cons.	1½	1½	42¾–43¼	+ ½	...	43	April 3	3 15 3	*Feb.*, Aug.	75¼	34
2,640,914£	Stk.	Do. Surplus Lands Stock	2½	2½	63–65	...	...	63½	April 2	4 4 9	*Feb.*, Aug.	72	58
3,235,000£	Stk.	Metropolitan District Ord.	Nil	Nil	29–29¼	+ 2½	...	29¼	April 4	...	*Feb.*, Aug.	51½	9½
500,000	10	Underground Electric Railways Co. of London	...	...	3–3½	...	...	61/3	April 2	...	...	5 1/16	1⅛
1,730,000£	...	Do. 4½% Bonds of 1933	4½%	4½%	99–101	...	...	100¼	April 3	4 9 3	Jan., July	102	73
1,112,707£	...	Do. 6% 1st Income Debs.	6%	6%	112–114	...	...	113¾	April 1	5 5 3	Mar., Sept.	118	108
6,120,750£	Stk.	Do. 6% Income Bonds	60/-	60/-	90–91	...	...	90½	April 4	6 12 0	Mar., Sept.	97⅛	18
1,150,477	1/-	Do. "A" Ord.	...	...	⅜–7/16	...	...	8/1½	Mar. 31	...	...	⅜	⅛

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Metropolitan Electric Tramways.—The revenue for the year amounted to £539,245. After adding the balance brought forward, and deducting all expenses chargeable to revenue, there remained £52,282. The directors proposed to place to reserve account £12,000, and to pay a dividend on the ordinary shares at the rate of 3 per cent., leaving to be carried forward £1,052. Through running arrangements with the London County Council Tramways had been extended, and the company's cars now run to Euston, Holborn, and Smithfield. The following is a summary of particulars relating to traffic: Mileage open, 56·25 miles; number of passengers, 94,426,011; car-miles run, 12,225,429; average receipts per car-mile, 9·31d.; average receipts per passenger, 1·209d.; number of cars in stock, 312. In proposing the adoption of the report at the meeting on March 25, Mr. E. Garcke observed that the fall in the dividend on the ordinary shares from 5½ to 3 per cent. was not due to the amalgamation. The underlying cause of the fall was the motor omnibus competition, but a large part of the damage done to tramway revenue had been made good to the shareholders who had converted their shares, because they were participating in the profits of the omnibus service and power supply of the London Suburban Traction Company. M.E.T. preference shareholders who had converted their shares received £5 6s. per cent., instead of 5 per cent., and the ordinary shareholders 5 per cent., as compared with 5½ per cent., while those who had not converted only received 3 per cent. They hoped to better themselves in the future, for the divergent interests were being adjusted, and wasteful competition would be still further reduced. While the receipts from tramways had improved by over £15,000, the running expenses had increased by £16,000 or £17,000. The revenue from dividends had increased to £48,600 from £35,800.

London United Tramways Company.—The report of the London United Tramways Company for the year 1913 showed gross receipts amounting to £337,193. Adding the balance brought forward and deducting all expenses, including an appropriation of £20,000 to the reserve for reconstruction and renewals, there remained £14,600. The directors recommended a dividend on the preference shares at the rate of 1 per cent. per annum, leaving to be carried forward £2,100. Expenditure to the amount of £12,825 had been charged to the reserve for reconstruction and renewals, and £2,636 to general reserve. The gross traffic receipts showed an increase of £5,662. Owing, however, to the increased cost of coal and material, and to special expenditure on permanent way and overhaul of rolling stock, the net profits decreased by £5,635. During the year a substantial increase had been made in the rates of pay of conductors. The mileage now open is 53·5 miles. 12,645,125 passengers were carried, and 9,407,226 car-miles were run. The average receipts per car-mile were 8·55d., and per passenger 1·26d. The company now had 338 cars.—Mr. W. M. Ackworth presided at the annual meeting on March 25. He said that more than 97 per cent. of the shares had been exchanged for the shares of the London and Suburban Traction Company. There had been an increase in the traffic receipts of £5,562, but owing to the increased cost of coal and other material the expenses had increased by £12,000, so that the net profits showed a decrease of £5,635 compared with 1912. They might look for a reduction of expenses during the current year, as the coal contract had been placed at a good price, and there had been a fall in cost of materials. They carried 60,000,000 passengers.

London and Suburban Traction Company.—The report for the 13 months ended December 31 showed that the revenue, including the dividends and interest receivable upon its investments in and loans to the subsidiary companies, amounted to £105,370. These companies were the Metropolitan Electric Tramways, London United Tramways, Tramways (M.E.T.) Omnibus Company, Limited, the South Metropolitan Tramways and Lighting, and the Gearless Motor Omnibus. After deducting all expenses chargeable to revenue, including debenture and loan interest, there remained a balance of £88,252. Out of this balance the 5 per cent. dividend on the preference shares had been paid, leaving a balance of £8,597, which the directors proposed to carry forward. The directors anticipated that the income of the company from investments would be considerably larger in future years, especially as the omnibus fleet was not in full service until August last.—Mr. C. H. Stuart Wortley, M.P., who presided on March 25 at the annual meeting, said that the company's function was to promote co-operation and thus prevent waste, but it was none the less their business to satisfy the public. They believed that in the districts served by their subsidiary undertakings, and in respect of the services and supplies that they there provided, the public had been conscious of little or no change following upon the creation of this new partnership, except such changes as had consisted of continued improvements in both quality and quantity. Through their holding in the M.E.T. they were indirectly owners also of controlling interests in the North Metropolitan Electric Power Supply Company and its subsidiary, the North Metropolitan Electrical Power Distribution Company. The total traffic receipts of all the traction and omnibus undertakings were £1,152,619. A total of 219,000,000 passengers were carried in 1913, and 37,000,000 units of electricity were sold. They had an income of £98,925 from their holdings in the subsidiary companies.

PERSONAL.

Mr. F. J. S. Hosken, general manager to the Darwen Corporation Tramways, has been granted an increase in salary.

Mr. W. M. Rogerson, borough electrical engineer at Halifax, has been granted a £100 increase in his salary, raising it to £600.

Mr. W. T. Robson, general manager of the South Shields Corporation Tramways, has been unanimously voted an increase of salary of £50 per annum.

Mr. H. H. Jowers, of Stockport, has been appointed mains and permanent way superintendent to Darlington electricity and light railways department.

Chief Inspector E. Edwards, of Leyton Council Tramways, has been recommended by the Establishments Committee for an increase of his salary to £156 per annum.

Mr. John Aldworth, general manager of Nottingham Corporation Tramways, has been granted, by the City Council, an increase in salary from £900 to £1,000 per annum.

Mr. J. A. Robertson, who for ten years has been electrical engineer to Greenock Council, was on April 1 appointed city electrical engineer at Salford at a salary of £1,000 per annum.

Mr. H. Webber, general manager to Keighley Council Tramways, and borough electrical engineer, has been recommended by the committee for an increase in his salary from £300 to £400.

Mr. A. W. Szlumper, district engineer to the London division of the London and South Western Railway, has been appointed chief engineer to the company in place of the late Mr. J. W. Jacomb Hood.

Mr. J. A. Lycett, has been appointed chairman of the South Staffordshire Tramways Company, and Mr. B. Kingsford has been chosen to fill a vacancy on the board caused by the retirement of Mr. C. Shirreff Hilton.

Gateshead Tramways Directorate.—Mr. C. Shirreff Hilton has resigned his position as director of this company owing to pressure of other engagements, and Mr. H. A. Stagg, formerly secretary, has been appointed a director.

Mr. F. Ayton, tramways manager and electrical engineer at Ipswich, has been granted an increase of salary from £600 to £700 as from April 1 last, in lieu of the bonus for which he was recommended by the Electricity Committee.

Mr. R. F. Dixon, on leaving Hull Corporation tramways to become works superintendent in Southampton Corporation tramways department, has been presented with a case of fish knives and forks and a silver cigarette case by the staff and employees.

Mr. T. G. Richardson, of Bradford, has been appointed manager of the Colne and Trawden Light Railway Company, at a commencing salary of £225. Mr. Richardson has been assistant to Mr. C. J. Spencer, general manager of the Bradford Corporation Tramways.

Mr. W. S. Murray has been appointed by the New York, New Haven, and Hartford Railroad Company to be consulting engineer in general charge of all electrical engineering and construction. He will continue with the firm of McHenry and Murray in general consulting practice.

Alderman T. Perrin, J.P., of Hyde, has been elected chairman of Stalybridge, Hyde, Mossley, and Dukinfield Joint Tramways and Electricity Board to fill the vacancy created by the death of Councillor J. Ridyard, J.P. Alderman H. Sykes, of Mossley, succeeds Alderman Perrin in the vice-chair.

Mr. A. E. Wray, assistant manager of the South Metropolitan Electric Tramways and Lighting Company, Limited, has been appointed general manager of the Gravesend and Northfleet Tramways. As a token of the esteem in which he is held by the staff of the South Metropolitan Company a handsome clock has been presented to him with an illuminated address.

Mr. J. W. Beauchamp, of Walthamstow, who was one of the selected candidates for the position of electrical engineer of Salford, has been recommended for an increase of his salary to £700 as from April 1, the future maximum to be £900, to be reached by annual increments of £100. He is to be asked to remain at Walthamstow for two years at least.

Bradford Officials' Salaries.—The following increases of salary have been made by the Tramways Committee: Mr. T. B. Moseley, chief clerk, from £165 to £190; Mr. J. W. Foster, engineering assistant, £245 to £270; Mr. T. Stirk, traffic superintendent, £235 to £250; and Mr. J. W. Dawson, assistant electrical engineer, £245 to £270, with a further £25 in April, 1915. Increases have also been granted to the other technical assistants, also to the various foremen.

Mr. John Harper, the acting chief commissioner of New South Wales Government Railways and Tramways, presiding at the annual meeting of the employees' institute at Sydney, remarked that the present staff had greater opportunities than were ever vouchsafed him, as whatever he knew he had had to pick up in a direct way as he went

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through the service. He joined the department in as humble a capacity as anyone present, and had now reached the top of the tree. The same chance was open to all.

London County Council Highways Committee.—At the meeting of the London County Council, on March 17, the following were appointed the members of the Highways Committee for the ensuing year: Sir J. Benn, Messrs. B. B. Evans, A. O. Goodrich, H. H. Gordon, G. H. Hume, W. Hunt, A. C. H. Kennard, T. H. Lidiard, Lord Monk Bretton, Messrs. T. Prestige, A. C. Rawson, A. H. Scott, W. J. Squires, H. Ward, Sir E. White, and Mr. A. W. Yeo. Mr. Hume has been elected chairman, and Lord Monk Bretton vice-chairman.

Salaries at Manchester.—The Corporation have adopted the recommendations made a few weeks ago for the following increases of salaries: Mr. J. Wood, assistant tramways manager, £500 to £600, by four annual increments of £25 each; Mr. J. T. Oakes, traffic superintendent, £475 to £500; Mr. J. A. Cookson, electric mains surveyor, £400 to £425; Mr. W. E. Foden, electricity department accountant, £425 to £450; Mr. F. E. Hughes, electricity department secretary, £475 to £500; Mr. E. Bolton, sub-station engineer, £375 to £400.

Mr. J. P. Tierney, general manager of Blessington Steam Tramways Company, has been appointed a director of the company, and will continue the management of the tramways. He has prepared plans for reorganisation, but the chairman, Mr. R. S. Guinness, states that owing to the legislative and unfortunate conditions with which baronial guaranteed lines are encircled no solution to the problem has yet been found, nor, in his opinion, will be found except by Act of Parliament. The net profit for the past half-year was £244, as against £98 for the corresponding period in 1912.

Mr. H. Richardson, who has had the offer of borough electrical engineer at Salford, is 38 years of age. During the 12 years he has managed the Dundee Corporation's undertaking he has carried out a scheme of reconstruction and reorganisation involving an expenditure of £26,000, which was met out of revenue. At a special meeting of Dundee Council on March 23 it was agreed to offer him an increase of salary from £650 to £800, with increments of £50 a year until the maximum of £1,000 is reached. Mr. Richardson was also asked to remain at Dundee for five years certain, and he has decided to agree to the proposal. Before going to Dundee he was assistant engineer of the Newcastle tramways department.

Mr. Robert Hammond, consulting engineer, who was one of the opposition witnesses called at the inquiry by the Light Railway Commissioners into the Dearne Valley tramways scheme, gave his evidence on March 5. The chairman (the Hon. A. E. Gathorne Hardy) congratulated him on the manner in which he had given his evidence. Mr. Hammond remarked he was pleased to be freed from further attendance, adding, "I was married at a quarter to ten this morning, and I am now going to have the wedding breakfast." Mr. Hammond has been presented by the past and present members of the Council of the Institution of Electrical Engineers with a handsome gift and a congratulatory address on the occasion of his marriage, and in recognition of his 12 years' service as hon. treasurer to the Institution. Another present which he has received came from past and present members of his staff.

Mr. C. C. Hutchinson, K.C., passed away on March 7, after a short illness. Mr. Hutchinson was one of the leaders for the Metropolitan Electric Tramways in their recent rating test case, which was won in the Court of Appeal, but was reversed in the House of Lords.

Mr. E. A. Lazarus-Barlow, London manager and a director of the Comptoir National d'Escompte de Paris, a director of the Anglo-Argentine Tramways Company, a former chairman of the British Thomson-Houston Company, etc., left estate valued at £226,332 gross, with net personality £221,315.

Mr. Walter Chipper, traffic manager of the York Corporation Tramways, died suddenly on March 10. Mr. Chipper, who was 54 years of age, went to York about eight years ago as manager of the horse cars, and on the substitution of the electric tramways he was appointed traffic manager under Mr. J. W. Hame, the general manager. He had been for many years manager at Woolwich, where he began his career. He was highly esteemed at York.

Mr. George Westinghouse, the inventor of the Westinghouse brake and founder of the Westinghouse Electric Company, of Pittsburg, U.S.A., died on March 12, at New York. Mr. Westinghouse was born in 1846, and he became assistant engineer in the U.S Navy in 1864, and held the post until 1865, when he invented a device for replacing derailed steam cars. Three years later Mr. Westinghouse patented his invention of the air brake. He built the first ten great dynamos at Niagara, and others for the elevated and subway roads in New York, and the Metropolitan Railway in London. He also founded in various countries the great engineering works which bear his name, including the British Electrical and Manufacturing Company, whose works are at Manchester.

CONTRACTS AND ORDERS.

Lorain Steel Company are supplying 100 tons of tramway rails, etc., to Plymouth Council, at £746.

Leyland Motors, Limited, have received an order from Accrington Council for a 30-H.P. motor tower wagon.

Dick, Kerr and Company, Limited, have received an order for four tramcars from Exeter Corporation Tramways.

Newcastle-on-Tyne Council have placed a contract with C. A. Parsons, Limited, for the supply of a turbine, at £8,170.

E. Green and Son, Limited, have a contract for fitting larger pipes to the economiser at the Walthamstow electricity works, at £620.

Dublin United Tramways Company have placed a contract with the Edison and Swan United Electric Light Company for a supply of lamps.

Hurst, Nelson, and Company, Limited, are constructing two double-deck top-covered cars, at £877 10s. 6d. per car, for Ayr Corporation Tramways.

British Westinghouse Company's tender has been accepted by Johannesburg Council for the supply of six 500-KW. rotary converters complete with switch gear, at £8,242.

Trail Cars for York.—A contract has been given by York Council to the Brush Electrical Engineering Company for the supply of four trail cars for the tramways department.

Siemens Brothers Dynamo Works have received a further contract for the annual supply of Tantalum traction lamps for the Croydon tramways; also for Wotan drawn-wire lamps.

Glasgow Council have accepted the tenders of Bolckow, Vaughan, and Company for steel rails and fish plates, of John McSkimming for steel drop forgings, and of Dryers, Limited, for car brake gear.

British Insulated and Helsby Cables, Limited, have secured at their Prescot works a contract for supplying the overhead equipment of the Melbourne suburban railways, amounting to nearly £300,000.

Walsall Council have accepted the tender of Ferranti, Limited, for a 150-K.V.A. transformer, £112; of Walsall Electrical Company for switch gear, £50; and of the General Electric Company for a motor, £20.

Swindon Council have awarded a contract to the Building and Public Works Construction Company for the construction of the foundations and condenser pit for additional plant at the electricity works.

Carlisle Council have placed the following contracts: Oerlikon Company, turbo-alternator and condensing plant, £4,908; British Westinghouse Company, Limited, rotary converters, £2,855, high-tension switch gear and second feeder panel, £975.

Birmingham Tramways Committee have accepted the tender of the General Electric Company for the supply of 25,000 traction type of Osram lamps. The same company have received a contract for the annual supply of Osram lamps to York Corporation.

Derby Council have placed the following contracts: Babcock and Wilcox, Limited, boiler, £1,900; British Insulated and Helsby Cables, Limited, high-tension cable, £887, and hard-drawn copper; F. W. Brackett and Company, Limited, water screen, £278.

The National Time Recorder Company, of 5, Blackfriars Road, S.E., patentees and manufacturers of time recorders, inform us that they have obtained the contract for the supply of their patent check-action automatic time recorder to the Metropolitan Water Board.

Wolverhampton Council have accepted the following tenders: United Electric Car Company, fixing six top covers to cars; W. Hayward and Sons, steelwork for bunkers for boiler house extension; Belliss and Morcom, Limited, repair of reciprocating engine plant.

Bradford Council have accepted the following tenders: North Eastern Steel Company, 800 tons steel girder tram rails, £6 6s. per ton; Thermit, Limited, 800 welding portions required for welding rail joints 19s. 6d. per portion, less 5 per cent.; C. H. Spencer, trolley bases for trolley vehicle cars, £370.

Cliff Railway for Torquay.—Offers from four firms have been received for the construction of a cliff railway to connect Babbacombe Downs with Oddicombe Beach, and Torquay Council have deferred a decision pending receipt of plans from the National Electric Construction Company, and T. L. Harding and Sons, of Torquay.

Bexley Council have placed with the British Westinghouse Company a contract for the supply of a 500 KW. turbo-alternator, at £3,675. There were 11 tenders, the highest being £5,064. For a water-tube boiler the tender of the Stirling Boiler Company has been accepted, at £1,703. Of five tenders the highest was £2,821.

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Southend Council have allotted the following contracts: Belliss and Morcom, Limited, five Diesel oil engines (including £200 for contingencies), £14,510; Brush Electrical Engineering Company, Limited, three single-deck open-type tramcars, £2,811, three coal trucks, £166 10s., electrical equipment for three coal trucks, £711.

Thermit, Limited, have contracts in hand, or shortly to be commenced, for welding at the following, among other places: Bolton, Burnley, Bradford, Brighton, Bournemouth, Dublin, Manchester, Liverpool, Salford, London County Council, London United Tramways, Sheffield, Southend, Rotherham, Northampton, Nottingham, Huddersfield, Warrington, Shipley, etc.

British Thomson-Houston Company have received a contract to supply Exeter Council with a 1,000-kw. high-pressure steam turbo-alternator, at the price of £4,211. The new plant is rendered necessary owing to the increasing demands upon the power-station and, in particular, the additional requirements of the tramway undertaking owing to the additional cars about to be put upon the system.

Southampton Council have contracted with the following firms for annual supplies to the tramways department: Armstrong, Stevens, and Company, bolts and nuts; Ralph Harris, iron and steel; Hooper and Ashby, white lead and cement; Lankester and Sons, iron and brass screws, files and nails, motor grease, hack saw blades and drills; Summers and Payne, vaseline, etc.; G. P. Wilson and Son, castings; W. Dibben and Sons, tools.

Sheffield Council have placed contracts as subjoined: G. Heathcote and Company, constructional steelwork for extensions to boiler house, £12,350; Wellerman Brothers, additions to Jobson Road transformer sub-station, £198, and Chapel Lane sub-station, £258; Wolseley Car Company, motor wagon, £550; Electric Construction Company, three feeder panels, £148 12s.; Stirling Boiler Company, retubing two Stirling boilers, £703, supply and fixing of two superheaters, £320.

The Mirrlees Watson Company, Limited, have recently received orders for condensing plant for Leeds Corporation (per Willans and Robinson, Limited), Haunchwood Colliery (per Greenwood and Batley, Limited), Griff Colliery (per Greenwood and Batley, Limited), Millom and Askam Hematite Iron Company, Limited (per Fraser and Chalmers, Limited), Langwith Colliery, Enfield Lock, Burgh of Kilmarnock, Ardrossan Harbour Company, Frickley Colliery, Swanwick Colliery, Brunner, Mond, and Company, and Hulton Colliery.

Yarmouth Council have accepted the following tenders: John Baker and Company (Rotherham), Limited, 40 steel tyres at 34s. 6d. each, finished, machined, and delivered; C. and J. Webb and Company, Limited, 90 tunics and pairs of trousers for motormen and conductors at £1 13s. per suit, for chief inspector £2 6s. 6d., for inspectors £2 4s.; Yarmouth Stores, caps at 2s. 6d., for inspectors at 6s. 9d.; C. A. Campling, Limited, for tickets at 2½d. per 1,000, and 10d. per thousand with the advertising rights.

Ipswich Council have allotted the appended contracts:

Alternator, rotary converter, automatic voltage regulator and certain switch gear, British Westinghouse Electric and Manufacturing Company, £2,213; three 50-kw. transformers and a testing transformer, Ferranti, Limited, £194; high and low-tension switch gear for main power-station and sub-stations, Voigt and Haeffner (England), Limited, £1,093; two rotary converters for Duke Street converter sub-station, British Westinghouse Electric and Manufacturing Company, at £1,566; high and low-tension underground cable sections A and B, Ateliers de Constructions Electrique du Nord et de l'Est (agents, W. H. Butler and Company), £6,158; service boxes, British Insulated and Helsby Cables, Limited, Prescot, at £40.

Manchester Council have given out the following contracts:

Babcock and Wilcox, Limited, two water-tube boilers and induced-draught plant; Lancashire Water Cooler Company, water cooler; Edison and Swan Company, Limited, high and low-tension switch gear; Crompton and Company, Limited, balancing plant; Vaughan and Son, Limited, 7½-tons overhead travelling crane; British Westinghouse Electric Company, Limited, Electric Construction Company, Limited, and Ferguson, Pailin, and Company, high and low-tension switch gear for sub-stations; British Insulated and Helsby Cables, Limited, Johnson and Phillips, Limited, Connolly Brothers, Limited, Chas. Macintosh and Company, Limited, and Electrical Engineering and Equipment Company, Limited, supplies of cable.

London County Council have given orders as follow: Hadfield's Steel Foundry Company, special trackwork for tramway junction at Falcon Road and Lavender Hill, £2,000; Brecknell, Munro, and Rogers, 150 uninsulated trolley heads with booms, £195; Electro-Mechanical Brake Company, 100 car sets of unbreakable grid rheostats, £812 10s.; Buller's, Limited, 12,000 track insulators, at £19 15s. 10d. a 100; Gaskell and Grocott, 5,000 porcelains, at £3 6s. 8d. a 100; Taylor, Tunnicliff, and Company, 5,000 porcelains, at £3 13s. a 100; Johnson and Phillips, 150 two-way change-over switches, at £1 15s. each, £262 10s.

West Ham Council have accepted tenders for annual supplies as appended: Davies, Kent and Stewart, and J. H. Tucker and Company, Baxter and Caunter, Falk, Stadelmann and Company, and Field Brothers and Company, Edison and Swan United Electric Light Company, J. and H. Grevener, E. Dewhurst and General Electric Company, electrical fittings and accessories; Gillespie and Beales and Armorduct Manufacturing Company, cables. The contract of the British Westinghouse Company for transformers has been extended for two years from April 1, and the contract with the Fuller Electrical Company for a further year.

TRAMWAY AND LIGHT RAILWAY NOTES.

BIRMINGHAM.

EXPERIMENT WITH FIRST-CLASS CARS—CENSUS OF LIKELY NIGHT PASSENGERS.

While the cost of running the first-class cars on the Hagley Road route is stated to be 9d. a mile, the receipts so far have averaged only 6d. a mile. A 20 minutes' service has been run. Six vehicles were fitted up for use as first-class cars, in compliance with the requests of residents in the district who opposed the construction of tramways on this route and expressed a preference for motor omnibuses. The Tramways Committee, on March 17, decided to make a further trial of the innovation of charging double fare for the use of the more luxuriously fitted lower saloons. From the night workers of the city the Tramways Committee have received a request for the running of an hourly service of cars on all routes between midnight and 4 a.m. To enable the committee to judge whether the traffic will warrant the additional services, the committee directed a census to be taken on a number of routes of the number of persons walking about between one and four o'clock. They recommend the starting of a trial service.

BOLTON.

ILLUMINATED CAR DURING A SHOPPING WEEK.

At the request of a deputation from the Traders' Association the Tramways Committee have directed the tramways manager to run an illuminated car during the shopping week to be held in Bolton from April 20 to 25. Owing to the impracticability of completing the car in time the committee have had to decline to comply with a request for it to be run in Chorley Old Road from April 2 to 10, on the occasion of a window-dressing competition.

BRIGHTON.

ROSETTES AND SPAN WIRES—RAILLESS TROLLEY SCHEME.

During the relaying of the tramways in York Place and London Road, Brighton, Mr. Wm. Marsh, the engineer and manager, has removed several standards and attached the wires to rosettes fastened to houses. It is intended to adopt rosettes very largely in the installation of the railless trolley car system in such narrow streets as Western Road, North Street, and St. James's Street. While Brighton Corporation have decided in favour of the under-running system of railless trolley traction, owing to the necessity of crossing tramway tracks, the Hove Council appear to prefer the over-running system. Brighton Council have, therefore, suggested that the matter be referred to the arbitration of the Board of Trade after a trial at Hove.

COLNE.

MUNICIPAL WORKING OF THE LIGHT RAILWAYS.

The Colne and Trawden Light Railways were taken over by the Corporation at midnight on March 24. Mr. T. G. Richardson was recently appointed manager for the Corporation.

DUDLEY.

PLEASANT RELATIONS BETWEEN COMPANY AND EMPLOYEES—HALFPENNY FARES—SUGGESTED TRAMWAY CENTRE.

The annual dinner of the Dudley and Stourbridge Electric Traction Company's employees' union was held on March 11, when Mr. J. Ward, superintendent of the line, and Mr. H. Hanks, superintendent engineer, were among the guests. Mr. W. Green, the secretary of the union, in proposing "The Company," asked Mr. Ward to convey to Mr. G. W. Bond, the general manager, the thanks of the men for the courteous way in which he had received any communications from them. He also asked Mr. Hanks to thank Mr. Bond for granting to the shedmen a holiday such as was given to the traffic department. In replying to the toast, Mr. Ward remarked that it was only by being comrades in the best sense that they could serve the company efficiently. The troubles suffered in many industries had frequently arisen because there had not been manifested that spirit of conciliation which had prevailed among the men engaged in this service. Mr. Hanks expressed gratification at finding such a splendid feeling between all branches. Satisfaction has been given by the institution of halfpenny fares between Stourbridge and The Hayes. The through fare will continue to be 1½d., but there will be three halfpenny stages. The *Midland Evening News* has suggested that Dudley Council should consider the question of a tramway centre for the seven routes along which the cars come into the town.

GLASGOW.

PROPOSED ALL-NIGHT CAR SERVICE—FARE CONCESSIONS UNDER CONSIDERATION.

The Trades Council have forwarded a petition to the Corporation in favour of all-night cars. By the mover of the proposal the contention was advanced that the cars ought to be run for the convenience of the public and not so much to earn a profit. The Finance Committee of the Tramways Committee have agreed to recommend that an all-night service of cars be tried as an experiment in the autumn, as the summer months would not give a fair test, owing to the large number of persons

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who then reside out of the city. The general manager has presented a report on the suggested extension of the penny stage from two to about three miles and the halfpenny stage from one mile to a mile and a half. Consideration of the report was adjourned.

LIVERPOOL.

INCREASING TRAFFIC—ANCIENT TRAIL-CARS SCRAPPED—ALL-NIGHT SERVICE QUESTION—SPECIAL TRAMROADS.

A feature of the new year of the Corporation tramways is the upward tendency of the receipts as compared with the corresponding period of last year. Up to March 28 the takings showed an increase of £8,706 for the 12 weeks of the present year. Last year the Tramways Committee handed over £100,000 to the relief of the rates. The Tramways Committee have ordered the single-truck motor and trail cars used at the introduction of electric traction to be broken up and sold as scrap material. These cars were obtained from Germany in 1898. While contending that Liverpool is differently placed to large industrial centres, the tramway management is watching the result of the all-night services in Manchester and Birmingham, and will take action accordingly. Mr. J. A. Brodie, the city engineer, presiding at a conference held in connection with the Liverpool Town Planning and Housing Exhibition, referred to the fenced-off tramway track which is being constructed in Edge Lane, Liverpool. Speed was becoming a matter of so much greater importance that, in his view, the tramcar would respond with a fenced-off track in the roadway, along which it could travel at a speed in advance of anything likely to be legalised on a roadway used by general traffic. The tramways in Edge Lane would be laid on sleepers across grass at a cost of £3,000 per mile instead of £6,000, and a duplicate narrow roadway would, when required by the development of the land alongside, be provided. Mr. H. E. Stilgoe, city engineer, Birmingham, endorsed Mr. Brodie's suggestions, and mentioned that Birmingham had increased its area from 14,000 acres to 43,000 acres. This demanded a system of arterial roads, and the first ring road projected was 100 feet wide.

LONDON.

FACILITATING CAR TURNING—EXTENSION OF THROUGH RUNNING—SECOND EMBANKMENT SHELTER—HIGHER SPEED.

In order to cope with the number of passengers who congregate at the Elephant and Castle stopping place, the County Council have decided to install a cross-over in Borough Road, so that the turning of cars will be facilitated in Newington Causeway. The work will be carried out by the staff of the tramway department. Subject to the payment of a rent at the rate of £2,500 a year, the Metropolitan Electric Tramways Company are to continue the working of the Council's tramways in Archway Road, Highgate, for a further period of six months, or until such earlier date as it may be possible to institute through running. The City of London Corporation have agreed to the plans submitted for the erection of a second shelter for tramway passengers a short distance to the west of the existing structure at Blackfriars. The additional accommodation will enable the rush hour traffic to be dealt with more expeditiously. The shelter will be 105 ft. in length and 7 ft. in width; the existing building being 190 ft. long. Application has been made to the Board of Trade to sanction an increase of speed on the London County Council tramways to 16 miles an hour where 12 miles is now permitted. The higher speed is needed in order to meet omnibus competition. Prosecutions by the police of tramcar and omnibus drivers have often shown that the two classes of vehicle have been travelling at the rate of from 16 to 20 miles an hour. It is noteworthy that at motor car speed limit inquiries the police always put forward the view that restriction of speed produces traffic congestion.

Metropolitan Building.
New York, March 14, 1914.

J. M. Cater, Esq.,
Manager, Peacock Brake Co.,
London, England.

Dear Sir:-

My attention has been called to Mr. G. S. Ackley's open letter, published in the Tramway and Railway World, in its issue of February 12th, 1914, in which he seeks to convey the impression that no brake except the "Peacock" was in the recent New York test of geared hand brakes, and in which he denies my statement to the effect that large orders for the "Peacock" Improved Brake were placed as a direct result of competitive tests.

The subjoined letter from the Superintendent of Equipment of the Brooklyn Rapid Transit System, and that of the Secretary of the Public Service Commission having the Greater City of New York within its jurisdiction, will conclusively show that the Ackley Brake was, in fact, in the test and was there defeated.

These official statements are irrefutable and carry their own conviction.

I may add that the "Peacock" Improved Brake used in the test and the 4,036 brakes purchased by the Brooklyn Rapid Transit System are identical in every way with those manufactured and sold by you in Europe.

Yours very truly,
J. L. Peacock

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION
FOR THE FIRST DISTRICT
RISUNE BUILDING
154 NASSAU ST.
TELEPHONE 7100 BEEKMAN
COUNSEL GEORGE S. COLEMAN
SECRETARY TRAVIS H. WHITNEY
COMMISSIONERS
EDWARD E. McCALL, CHAIRMAN
MILO R. MALTBIE
JOHN E. EUSTIS
J. SERGEANT CRAM
GEORGE V. S. WILLIAMS

NEW YORK March 9, 1914

J. L. Peacock, Esq.,
1023 Metropolitan Life Bldg.,
23rd Street & Madison Avenue,
New York, N.Y.

Dear Sir:

Replying to your inquiry of March 8, 1914, we give below the names of the different types of geared hand-brakes which were tested by the Brooklyn Rapid Transit Company under the supervision of our Electrical Engineer, Mr. Clifton D. Wilder:

Peacock Improved,
Peacock,
Ackley,
Little Giant.

The results of these tests, which were placed before the Commission by the Company's engineer and by Mr. Wilder, showed the Peacock Improved brake to have been the most efficient.

Very truly yours,
Secretary

CWW/DH

Mr. J. L. Peacock.
N. Y. City.

Mar. 6-14.

TRANSIT DEVELOPMENT COMPANY
68 CLINTON STREET
BROOKLYN, N. Y.
OFFICE OF SUPT. OF EQUIPMENT

Dear Sir:

Referring to advertisement in the Tramway & Railway World, dated Feb. 12, 1914, and which you showed me in my office this morning, ...

I wish to also state that the brake staff is not square but is round and key-seated, this, after careful consideration, having been determined by us as being the best.

Yours truly,
Supt. of Equipment.

The "PEACOCK" BRAKE CO., 27, Clements Lane, LONDON, E.C.
Telephone No. 5735 Central. Telegraphic Address "INBRAKE, LONDON"

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MANCHESTER.

General Manager and Engineer's Tour—Roofs for Island Platforms.

The Tramways Committee on March 23 had under consideration the report presented by Mr. J. M. McElroy, general manager of the tramways, as a result of the tour made by himself and Mr. Mattinson, the permanent way engineer, to study traffic conditions in the chief cities of the United Kingdom, Europe, and America. The committee expressed their thanks to Mr. McElroy for the admirable report he had prepared, and it was ordered to be presented to the City Council the following week. Subsequently, at the request of the Watch Committee, Mr. J. H. Thewlis, their chairman, and the Chief Constable, will leave for the United States to report upon the methods of dealing with traffic congestion there. A summary of Mr. McElroy's report is given elsewhere in this issue. Following the erection last year of shelters in several parts of the city, the Tramways Committee are placing roofs over a number of island platforms. The only central shelter in existence is at Stevenson Square, but a refuge is being constructed in Piccadilly. Difficulty has been experienced in securing sites owing to property owners and shopkeepers refusing to give permission for the erection of roofs. Land has been purchased at Barlow Moor Road terminus, Chorlton, for the construction of a siding, and the plans also include offices and a shelter. The Piccadilly refuge is an experiment. As the platform is only three yards wide, space does not permit of complete protection from the weather, and if the glass roof which has been erected answers its purpose, Mr. McElroy is hopeful that others may be erected at stopping places. There has been a complete re-arrangement of the lines and junctions at this site, while the island platforms have been widened, and the central poles removed to the sides of the road.

NEWCASTLE-ON-TYNE.

New Cars

The Corporation have agreed to apply for sanction to borrow £12,240 for the purpose of acquiring 15 double-deck top-covered tramcars.

PERTH.

Central Car Shed.

The Tramways Committee are recommending the Council to erect a car shed in King Edward Street, in order to save the dead mileage to Scone depôt, and also to enable a full service of cars to be put on more easily during wet weather, or when entertainments are taking place in the city.

ROCHESTER.

Paving in Light Traffic Districts.

At the request of Rochester Council the Board of Trade have agreed to the use of macadam paving in lieu of granite setts between the kerb or fence and the nearest rail on each side of the road on Strood Hill, and similar paving on Frindsbury Hill between the kerb or fence and the nearest rail on each side of the road, and also in the interspace between double tracks where such space is not less than 3 ft. 6 in. The Council have agreed with Mr. W. Jensen, the general manager of the Chatham and District Light Railways Company, for the margins of Frindsbury Hill to be paved with macadam, 4 in. setts to be put outside the rails. If this proves a success the margins of Strood Hill will be treated in the same way. The question of paving the interspace between the double tracks has been deferred

SALFORD.

Rejection of Halfpenny Fares.

By 26 votes to 9 the Corporation have rejected a proposal to instruct the Tramways Committee "to establish halfpenny fares on all short-distance stages within the borough." Alderman Linsley, chairman of the committee, stated that of 50 million tickets issued last year 35 millions were penny ones. The penny ticket was the backbone of the undertaking. The adoption of the halfpenny stage might mean that the department would be unable to contribute anything to the rates. The committee were going to issue halfpenny single tickets instead of penny return ones to children.

WEST HAM.

Car and Equipment Standardisation.

After consideration of a report by Mr. J. S. D. Moffet, the general manager, the West Ham Tramways Committee have recommended: (1) That 15 top-covered bogie cars (London County Council type) be purchased immediately, and if desirable a new single-truck, rigid wheel-base, covered car; (2) that the Council standardise, as far as possible, on two classes of cars, with standard trucks, equipments, and bodies, on the following lines: Class A—A single truck, rigid wheel-base, top-covered car, with seating accommodation for 60 passengers. Class B—Bogie cars of the London County Council type, with seating accommodation for 78 passengers; the motor equipment for the smaller cars to be not less than 35 B.H.P. per motor, and for the larger cars not less than 45 B.H.P. The committee advise that the present stock of cars and equipments shall be gradually brought into line with the above-mentioned standards as opportunity arises, or replaced as circumstances require, and that arrangements be made as early as possible to replace with standard apparatus 70 controllers, which differ in operation from the majority in use on the system.

DEARNE VALLEY SCHEME SANCTIONED.

Fate of Objections Based on the Tottenham Rating Appeal.

Subject to certain conditions, the Light Railway Commissioners have expressed their willingness to grant the major part of the application made by the Wombwell, Wath, Bolton, and Thurnscoe Urban Councils for powers to construct various light railways. The Commissioners do not consider it necessary that the proposals should be submitted to Parliament, but on this point they observe that a special discretion is reserved under the Light Railways Acts to the Board of Trade; and, if the Board should think otherwise, an opportunity for such submission is afforded under the Light Railways Act, 1912.

In the course of his letter embodying the decisions of the Commissioners, their secretary (Mr. A. D. Erskine) says: "On behalf of the railway companies the recent judgment of the House of Lords in the 'Tottenham Electric Tramways Case' was also referred to; and it was argued that the Commissioners had no jurisdiction to deal with the application for these light railways; and further that, inasmuch as the contribution to the general rate in respect of such lines as these, if promoted under the Tramways Act, 1870, would be upon a higher scale than if promoted under the Light Railways Acts, the other ratepayers (including the railway companies) would be placed under a corresponding disadvantage by the lower assessment under the light railway procedure. It appears to the Commissioners that the point for decision in the 'Tottenham' case was whether a tramway, to which the Tramways Act, 1870, is applicable, is entitled to be rated as a railway; and it was no part of the decision to the contrary then given that the term 'light railway' must be construed in so restricted a sense as to preclude the construction of light railways in accordance with modern methods upon public roads. I should add that, although anomalies are introduced by the existence of different procedures in the case of lines in other respects very similar, the Commissioners are not in a position to alter that, nor in the matter of rating to vary the dispositions of the general law. A further objection was taken on behalf of the Great Central Railway that the proposals in the draft Order as to the constitution and powers of the Joint Committee are not in accordance with the terms of the Light Railways Act, 1896; but the Commissioners think that it is not necessary to read these terms in such a way as to limit the validity of the Acts of a Joint Committee to the duration of a single year; and that they have the necessary powers to make provision under the Order enabling the scheme in the hands of a Joint Committee to be carried on under such conditions as have been agreed upon between the Councils."

PATENT LIST.

Specially abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given below in italics.

Applications.

5,282 Mechanical train regulator or brake appliance—H. Philbey.
5,315 Automatic device for the lubrication under pressure of trolley wheels—J. Drapier and F. Gillet.
5,341 Railway sleepers—J. S. Todd.
5,351 Electrical train controlling systems—H. J. Warthen.
5,377 Hand-operated brakes for tramcars—W. Bardsley.
5,381 Application of internal-combustion motor—A. N. Shelest.
5,395 Signal indicators—H. Stoddart.
5,443 Chairs for railway rails—S. Davies and J. C. Morgan.
5,515 Antomatic current interrupter for high-tension overhead lines—W. Lehmann and H. Thomas.
5,622 Nut-locking devices for use in connection with railway rails—N. A. Buschmann.
5,685 Railway signalling and interlocking apparatus—T. E. Haywood, A. G. Kershaw, and Saxby and Farmer, Limited.
5,689 Emergency brakes for motor omnibuses—D. J. Thompson.
5,713 Double-decked vehicles for tramways and railways—L. Spangler.
5,807 Mechanical device for the automatic control of railway trains through existing brakes—H. Ballington and L. Shaw.
5,823 Railways—F. O. Hellstrom.
5,850 Automatic couplers for railway vehicles—C. Watson.
5,869 Means for automatically applying the brakes of trains—W. H. Shephard and A. E. McKechnie.
5,926 Metallic sleepers—W. W. Harris.
5,973 Rail joints—J. B. Evans, sen.
6,008 Railway locomotive controller—H. Hewitt, T. Gorst, and J. Smellie.
6,009 Route and destination indicators on tramcars—T. H. Purves,

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6,179 Railway signalling systems—M. H. Collins.
6,191 Speed indicator for railway trains—E. Dau.
6,199 Generation of electrical power for railway and tramway vehicles, etc.—W. P. Durtnall.
6,251 Tramways and light railways—J. Clayton and Seal Patent Valve and Tap Company, Limited.
6,299 Life-guards—H. Conradi.
6,358 Safety device for use on railways—F. Fay.
6,417 Motor omnibuses—J. A. Hope.
6,443 Brakes for tramway rolling stock—A. W. Maley and G. N. Cadbury.
6,481 Anti-friction mechanism as applied to the axle shafts of tram-car trucks—J. E. Cooper.
6,520 Means for electrically operating railway signals—Siemens Brothers and Company, Limited, and L. de M. G. Ferreira.
6,543 Brakes for railway vehicles—L. M. Masson.
6,576 Track brakes on railways—L. W., O. R., and D. D. Williams.
6,634 Railway tracks—L. Brewster.
6,652 Composite trolley wheels—E. M. Taunton and Electro-Mechanical Brake Company, Limited.
6,721 Automatic train stop—W. J. N. Howgego.
6,727 Skid brakes on permanent ways—D. Storjohann.
6,807 and 6,808 Train control apparatus—A. F. Bound and W. Rowland.
6,811 Bonding for electrical conduit systems—D. L. J. Broadbent.
6,968 Safeguard for motor omnibuses—F. A. Penson.
6,977 Overhead trolley wires—G. G. Glyn.
7,019 Train signal systems—W. E. Benn.
7,172 Safety appliances for motor omnibuses—R. Bonfield.
7,214 Trolley wheels—H. McReynolds.
7,362 Railway vehicles adaptable to change of gauge—J. H. Newton.
7,369 Life-guards—R. C. Elliott.
7,439 Means for attaching guide rails to transverse sleepers—C. Pasel.
7,447 Life-guards for motor omnibuses—T. Tiver and B. Staff.
7,583 Automatic car couplers—J. Willison and National Malleable Castings Company.
7,585 Joints of rails applicable to railway crossings—S. P. Smeltzer.
7,586 Switches for tramways—A. Wilkinson.
7,756 Automatic railway signalling—E. W. Jackson.
7,882 and 7,884 Electric insulation of rail joints B. R. Wills and J. C. Sykes.

PATENT WEATHER SCREEN FOR MOTOR 'BUSES.
NO GLASS. Instantaneously opened and closed.
ADJUSTABLE TO ANY DRIVER. NO REFLECTED LIGHTS.
As supplied to the Birmingham Corporation, Sheffield Corporation, and London & North Western Railway Co., etc., etc., etc.
Particulars apply **T. C. AVELING & Co. (B'ham), Ltd.,**
91, New Canal Street, BIRMINGHAM.

FOR HIGH-CLASS
CONDENSING PLANT
— WRITE TO —
THE MIRRLEES WATSON CO., LTD.,
SCOTLAND STREET, GLASGOW.

J. H. Butcher & Co. TRANSFER PRINTERS. BIRMINGHAM.

AILSA OILSKINS with Padded Seyes and Protected Sleeves. Send for sample of our latest improved pattern. AILSA OILSKIN CO. Manufacturers, Dairy, near Glasgow.

FOR MOTORMEN.
Extracts from Users' Letters:
"Ailsa Coats are best and cheapest we have ever had."
"Motormen's Oilskins supplied by you gave every satisfaction."
"The oilskin coats we now use are entirely confined to the 'Ailsa' manufacture."
"We have tried several makes of Oilskins, but none have been equal to the 'Ailsa' make."
"Past results have been so satisfactory that we have this year decided to place the whole of our order in your hands."

SPECIFICATIONS PUBLISHED.

1913.

2,981 Apparatus for controlling the speed of railway trains—Ward.
8,245 Apparatus for governing the speed of railway cars—Alexander (*Union Switch and Signal Company*).
14,024 Rail joints—Allen.
20,284 Trolleys—Wallace and Macey.
25,246 Guard rail supports for permanent ways—Pasel.
5,049 Reversible seats for tramcars—Anger.
8,922 Seats for tramcars—Rayner.
4,931 Section insulators for overhead conductors—Ramsey and Maley.
9,476 Rail chairs—Imray (*National Malleable Castings Company.*)
10,359 Renewable check rail either straight or curved—Elwell.
12,797 Rail chair—Collins.
16,705 Trolley heads—Underwood.
27,472 Electrically-driven vehicles—Siemens-Schuckertwerke Ges.
4,901 Automatic wireless train-control apparatus—Clark.
8,273 Electrical indicating apparatus for use on steam trains—White and Gardener.
8,624 Automatic systems of train control by means of separately-actuated contactors—Siemens Brothers Dynamo Works, Limited, and Duke.
10,794 Brake mechanism—Bowles.
15,381 Points and Crossings—Noll.
20,911 Rail joints—Corbin.
22,007 Switches and points for tramways and railways—Mozley, Whitaker, and Bland.
27,180 Sanding means for train-stopping devices—Hudson.

TRAFFIC RETURNS.
Colonial and Foreign Tramways.

NAME OF COMPANY.	1913. WEEKS ENDING. Mar. 8.	Mar. 15.	Mar. 22.	Mar. 29.	1914. WEEKS ENDING. Mar. 7.	Mar. 14.	Mar. 21.	Mar. 28.	AGGREGATE. Wks.	1914.	Increase or Decrease.
	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine	56.226	58,671	56,305	54,218	58,529	59,392	55,913	56,302	13	685,255	+ 22,100
Auckland ... ... (28 days)	...	19,566	...	...	...	23,332	...	...	36½	182,422	+ 3,327
Brazilian Street ... (month) Mlrs.	46,044	...	...	...	49,305	...	...	...	30	368,458	+ 57,293
Brazilian Traction	92,404	92,608	92,404	93,743	94,832	96,023	97,072	95,467	13	1,237,832	+ 75,289
Brisbane ... ...(month)	22,860	...	...	...	25,260	...	...	...	9	53,590	+ 5,920
British Columbia ... (month) $	688,333	...	...	...	704,003	...	...	...	35	6,034,831	+352,403
Buenos Aires Port and City (month)	...	...	...	...	...	...	...	...	—	—	—
Buenos Ayres Lacroze ...(month)	...	...	...	46,227	...	...	...	45,222	39	402,125	+ 7,115
Calcutta ... ... Rs.	67,166	64,660	62,068	61,404	70,006	67,630	65,616	64,708	13	8,84,622	+ 42,030
Cape Town ... ...(month)	12,195	...	...	...	13,342	...	...	...	9	27,988	+ 1,898
Carthagena and Herrerias ...(month)	...	...	...	3,695	...	...	...	2,425	13	8,120	- 1,952
Cordoba ... ...(month)	11,795	...	...	...	12,676	...	...	...	48	145,713	+ 12,767
East India ... ...(month)	...	...	...	1,760	...	...	...	1,884	35	15,402	+ 640
Kalgoorlie ... ...(month)	2,644	...	...	...	2,169	...	...	...	9	4,509	- 869
La Plata ... ...(month)	...	...	...	5,771	...	...	...	5,178	13	15,239	- 1,048
Lima ... ...(month)	32,206	...	...	...	33,880	...	...	...	9	71,758	+ 5,423
Madras ... ... Rs.	(2 weeks) 26,827	(2 weeks)		30,992	(2 weeks) 29,347	(2 weeks)		28,947	13	1,68,226	+ 9,821
Melbourne ... ...(month)	62,500	...	...	...	64,000	...	...	...	9	132,500	+ 3,000
Mexico ... (month) $	329,361	...	...	...	553,804	...	...	...	9	1,133,165	+242,169
Montevideo ... ...(month)	...	...	...	33,140	...	...	...	32,630	21	170,531	+ 856
Para	4,399	4,498	4,333	4,007	3,627	3,508	3,516	3,428	17	58,474	- 12,042
Port Elizabeth ... ...(month)	3,590	...	...	...	3,510	...	...	...	9	8,340	+ 252
Shanghai ... ... $	20,753	19,945	19,185	20,090	25,000	22,600	24,000	23,400	12	284,800	+ 47,164
Singapore ... ... $	11,200	11,956	11,506	10,971	12,544	12,724	11,838	11,161	13	156,840	+ 9,089
Toronto ... ... (month) $	718,313	...	...	...	777,683	...	...	...	9	1,625,628	+130,387
Winnipeg ... ... (month) $	320,431	...	...	...	350,977	...	...	...	9	733,648	+ 61,720

(*Continued on page 304*).

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TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1913. WEEKS ENDING.				1914. WEEKS ENDING.				AGGREGATE.		
	Mar. 8.	Mar. 15.	Mar. 22.	Mar. 29.	Mar. 7.	Mar. 14.	Mar. 21.	Mar. 28.	Wks.	1914.	Increase or Decrease.
	£	£	£	£	£	£	£	£		£	£
Aberdeen Corporation ...	1.451	1.337	1.372	1.382	1.550	1.493	1.459	1.433	43	68.519	+ 3.892
Accrington Corporation ...	494	520	539	666	533	544	553	546	51	29.253	+ 2.318
Ayr Corporation	204	196	212	277	241	233	240	231	45	16.258	+ 2.273
Bath Electric	633	702	695	685	745	717	709	720	12	8.486	+ 164
Birkenhead Corporation ...	1.144	1.123	1.119	1.312	1.210	1.213	1.205	1.773	52	67.392	+ 6.350
Birmingham Corporation ...	11.341	11.331	11.040	12.617	12.328	12.288	12.485	12.479	52	621.804	+ 51.493
Blackburn Corporation ...	1.065	1.231	1.038	1.885	1.195	1.127	1.165	1.235	52	66.820	+ 4.693
Blackpool Corporation ...	726	493	573	2.505	788	568	552	537	50	83.715	+ 10.831
Bolton Corporation ...	2.417	2.516	3.071	2.631	2.607	2.615	2.565	2.596	52	141.434	+ 6.965
Bournemouth Corporation	1.626	1.601	2.627	1.857	1.644	1.655	1.602	1.756	52	104.353	+ 8.658
Bradford Corporation ...	5.305	5.112	5.684	6.954	5.866	5.825	5.614	5.808	52	306.067	+ 17.733
Brighton Corporation ...	788	786	964	1.097	781	803	813	828	52	54.351	+ 2.701
Bristol	6.895	6.762	6.732	9.570	7.588	7.396	7.250	7.412	12½	90.342	+ 3.731
British Electrical Federation	39.991	40.139	40.820	48.873	52.336	49.998	50.161	51.548	...	—	—
Burnley Corporation ...	1.449	1.523	1.816	1.526	1.570	1.770	1.591	1.541	52	87.771	+ 8.354
Burton-on-Trent Corporation	256	271	275	291	285	276	273	271	52	15.233	+ 762
Bury Corporation	1.267	1.232	1.500	1.357	1.308	1.280	1.294	1.253	52	69.508	+ 2.194
Cardiff Corporation ...	2.487	2.536	2.450	...	2.661	2.574	2.653	...	51	137.876	+ 12.452
Chatham and District ...	815	791	816	994	835	811	810	831	12	9.761	- 422
Chesterfield Corporation ...	240	232	243	442	260	249	260	434	52	13.528	+ 1.379
Colne and Trawden ...	232	241	323	...	231	250	240	...	12	2.846	+ 27
Cork Electric	442	437	483	484	447	447	471	445	12	5.386	- 16
Croydon Corporation ...	1.473	1.438	1.470	1.720	1.591	1.504	1.507	1.598	51	83.964	- 5.914
Darlington Corporation ...	228	225	236	254	248	241	247	247	52	12.934	+ 1.138
Derby Corporation ...	901	888	964	1.097	958	949	905	928	52	50.659	+ 4.101
Dover Corporation ...	193	194	225	256	193	199	190	213	52	12.333	+ 26
Dublin and Lucan ...	119	113	141	177	114	111	128	110	12	1.387	- 104
Dublin United	5.512	5.302	5.316	5.885	5.455	5.264	5.605	5.172	12½	64.206	- 2.782
Dundee City	1.196	1.188	1.128	1.214	1.264	1.211	1.216	1.245	45	58.511	+ 3.869
East Ham Corporation ...	1.099	1.099	1.120	1.158	1.049	1.012	1.010	1.010	52	53.623	- 2.897
Exeter Corporation	278	272	272	398	296	293	286	295	52	17.320	+ 684
Gearless Motor 'Buses ...	...	...	...	...	441	447	449	488	13	5.636	—
Glasgow Corporation	19.822	19.305	19.540	20.404	20.850	20.117	20.979	21.349	43	879.563	+ 61.069
Glossop (Urban Elec. Supply Co.)...	119	121	134	129	120	122	116	116	13	1.550	- 36
Halifax Corporation	1,789	1.798	1,746	2.755	1.903	1.840	1.908	1.928	51	106.623	+ 3.270
Hastings and District	720	746	737	1,381	801	758	717	757	12	8.497	- 687
Huddersfield Corporation ...	1.997	2.004	1.949	2.730	2.135	2.080	2.187	2.129	52	104.421	+ 5.169
Hull Corporation	3.070	3.015	3.126	3.149	3.203	3.209	3.216	3.141	52	164.705	+ 8.214
Ilford U.D. Council ...	426	428	451	490	455	451	451	458	51	23.305	- 858
Ilkeston Corporation ...	119	120	139	109	125	127	123	123	52	6.806	+ 889
Ipswich Corporation ...	361	357	424	467	378	370	372	380	52	23.047	+ 630
Isle of Thanet	299	310	464	562	333	307	309	362	26	8.644	+ 257
Kilmarnock Corporation ...	154	153	157	166	165	156	164	158	45	7.875	+ 484
Lanarkshire	1.504	1.521	1.544	1.704	1.806	1.821	1.779	1.861	12	22.092	+ 2.793
Lancashire United ...	1.363	1.335	1.312	1.967	1.538	1.512	1.525	1.534	12	18.407	+ 1.806
Leeds City	7.859	7.595	7.707	8.991	8.071	7.958	7.897	8.085	52	420.170	+ 16.093
Leicester Corporation ...	2.637	2.744	2.769	3.214	2.813	2.913	2.798	2.880	13	34.731	+ 1.336
Leith Corporation... ...	623	634	632	649	649	641	679	668	45	31.819	+ 1.501
Leyton U. D. Council ...	1.159	1.180	1.239	...	1.268	1.225	1.230	...	50½	66.888	+ 360
Liverpool Corporation ...	12.143	11.999	11.798	12.692	12.792	12.729	12.645	13.540	12½	158.611	+ 8.706
Llandudno and Colwyn Bay ...	165	166	215	420	163	163	164	163	17	2.591	- 309
London County Council ...	40.716	40.674	40.270	41,227	42.569	42.289	42.554	42.694	51	2.165.810	+ 20.276
London General Omnibus...	56.106	56,826	52.186	58,219	56,733	52.998	53.649	58.783	13	709.807	+ 3.027
London United	5.477	5.494	5.542	6.922	5.846	5.437	5.386	5.540	13	66.430	— 560
Lowestoft Corporation ...	130	128	152	172	151	149	149	149	25	4.503	+ 367
Maidstone Corporation ...	166	160	159	...	177	169	158	...	51	9.938	+ 647
Manchester Corporation ...	16.621	16.523	16.816	17.827	17.358	17.101	17.243	17.875	52	909.257	+ 37.795
Metro. Electric Tramways ...	8.628	8.531	8.839	9.846	9.040	8.632	8.527	8.798	13	103.897	- 1.036
Nelson Corporation ...	174	176	228	245	184	200	187	260	52	10.802	+ 562
Newcastle-on-Tyne Corporation ..	4.615	4.726	4.664	5.136	4.998	4.880	4.937	5.041	52	256.103	+ 22.108
Newport (Mon.) Corporation ...	737	761	736	902	746	754	738	780	52	39.819	+ 2.423
New St. Helens and District ..	735	744	685	972	769	771	764	738	39	31.315	+ 2.510
Northampton Corporation... ..	510	501	510	682	536	535	544	522	52	29.513	+ 1.549
Nottingham Corporation	3.181	3.098	3.266	3.814	3.245	3.252	3.322	3.393	51½	171.907	+ 6.794
Oldham Corporation	1.921	2.028	2.122	1.783	2.115	2.147	2.118	1.566	52	114.176	+ 7.711
Portsmouth Corporation	1.778	1.691	1.768	2.350	1.952	1.886	1.774	1.922	52	114.419	+ 7.076
Preston Corporation	795	762	796	921	823	825	864	805	52	45.544	+ 2.646
Provincial...	1.622	1.565	1.744	2.111	1.679	1.592	1.589	1.665	25	43.385	+ 1.583
Reading Corporation	583	602	634	735	648	668	646	662	51½	35.642	+ 2.431
Rochdale Corporation	1.427	1.405	1.805	1.662	1.468	1.438	1.450	1.487	52	82.098	+ 2.130
Rotherham Corporation	872	870	1.219	864	866	883	867	844	52	52.253	+ 9.468
Salford Corporation	4.758	4.761	5.445	4.887	5.064	5.060	5.051	5.182	52	271.054	+ 12.155
Sheffield Corporation	7.065	7.095	7.106	7.912	7.611	7.528	7.421	7.495	52	382.764	+ 27.446
Southampton Corporation... ...	1.110	1.131	1.144	1.344	1.158	1.173	1.182	1.168	51	66.679	+ 3.324
Southend-on-Sea Corporation ...	573	581	569	930	722	714	698	711	52	46.754	+ 7.756
South Metro. Tramways	734	730	754	950	1.065	956	960	1.002	13	12.054	+ 3.052
South Shields Corporation ..	688	640	713	736	630	683	715	690	52	37.252	+ 4.054
Sunderland Corporation	1.327	1,298	1,405	1.391	1.355	1,355	1.277	1.322	52	74.399	+ 6.138
Swindon Corporation	139	142	146	190	152	160	153	163	51½	8.457	+ 443
Tramways (M.E.T.) Omnibus Co. ...	1.400	1.650	1.625	2.302	8.638	7.855	7.953	8.655	13	101.537	+ 92.198
Tyneside Tramways and Tramroads	464	488	454	899	500	476	508	471	12	5.686	+ 226
Wallasey Corporation	1,022	1.022	998	1,298	1,098	1,102	1,105	1.214	52	62.334	+ 5,433
Walsall Corporation	601	591	607	787	621	624	623	602	13	7.651	- 3
Walthamstow U.D. Council ..	660	673	707	819	733	696	696	723	52	38.328	+ 1.460
Warrington Corporation	453	442	470	476	456	442	442	428	51	22.929	+ 336
West Ham Corporation	2.598	2.556	2.726	2.924	2,725	2.676	2,697	2,725	51½	139.859	+ 4,158
Wigan Corporation	1,429	1.396	1.474	1.641	1.491	1.483	1.475	1.528	51½	76.859	+ 6.484
Wolverhampton Corporation ...	.989	1.049	1.252	995	1.033	1.071	1,010	1.036	52	55.582	+ 2.458
Yorkshire (West Riding)	1.302	1.276	1.406	1.734	1.385	1.429	1.384	1.368	13	18.429	+ 960

Electric Railways.

NAME OF COMPANY.											
Central London	5.186	5.242	4.680	4.675	5.312	5.303	5.404	5.224	13	67.773	- 1.575
City and South London	2.839	2.933	2.838	2.999	2.787	2.907	2.895	2.715	13	37.028	- 2.209
Liverpool Overhead	1.590	1.581	1.481	1.638	1.575	1.568	1.599	1.687	13	21.266	+ 653
London Electric	14.160	14.620	13.080	14.080	14.650	14.770	14.690	14.835	13	190.780	+ 2.510
Mersey	2.255	2.222	2.140	2.119	2.212	2.274	2.108	2.188	13	29.236	+ 111
Metropolitan	15.919	15.951	15.765	16.104	17.544	17.517	17.593	17.662	13	231.724	+ 20.539
Metropolitan District	12.892	13.587	12.582	12.829	13.054	13.190	13.339	13.834	13	172.470	+ 1.535

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officals and the principal particulars relating to each undertaking.

The directory is revised as occasion requires, and is the most up-to-date and comprehensive list published.

The Tramway & Railway World can be obtained, post free, at the following rates:
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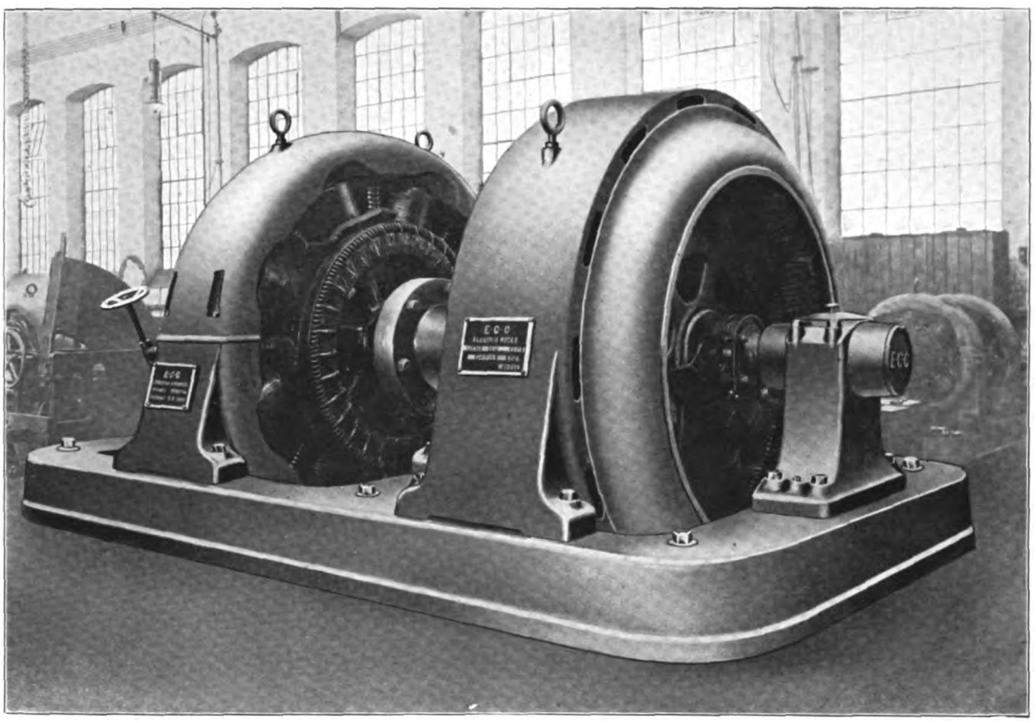

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ADDRESS—
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TELEPHONES—75 and 430 Wolverhampton.
TELEGRAMS—"Electric," Wolverhampton.

ADDRESS—
BUSHBURY,

WOLVERHAMPTON.

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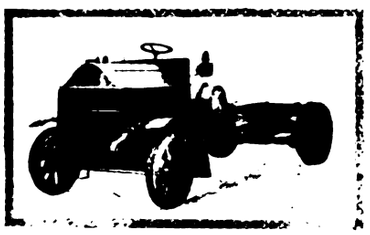

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C·A·V

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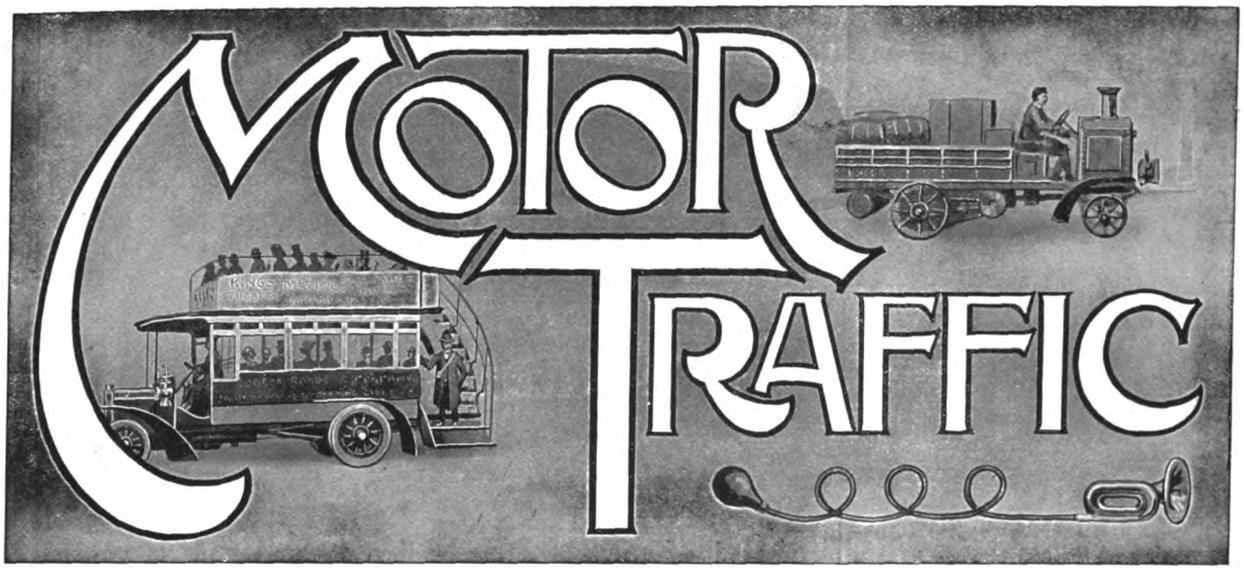

There is a double incentive to the municipalities to experiment with electric road motor vehicles for the public transportation of passengers, for use by local officials and committees, and for the conveyance of the by no means light goods for the various departments of a local governing body. The improved battery from America has a long trial to its credit in the United States; nevertheless, it is to the advantage of the municipal users that their own officials should compile the data which must be forthcoming in satisfactory measure if battery charging is to be made a source of revenue for the civic electricity undertakings. There can be no objection to encouraging private operators in the persons of agents to undertake also such pioneer work, for if the results prove satisfactory the greater will be the amount of current disposed of if a municipal department and an agent are both found to be recommending the electric vehicle. Whether agents will be in a position to handle the more expensive machine, as compared with petrol conveyances, depends chiefly upon the manufacturers. Circumstances, however, are decidedly favourable to the makers taking up the task of appointing district agents, for it has long been a complaint of pleasure car agents that there is little or no scope for them to do business by obtaining orders for commercial and industrial vehicles. Manufacturers as a body have preferred to open branch offices. Considerable courage is required by a municipality to do as the South Shields Tramway Committee have just done as the result of careful attention bestowed by their manager upon the claims of various types of omnibuses. For two electric vehicles and appliances the sum of £2,594 is to be paid. That this price can be obtained is a proof of the confidence inspired by several years' trials in the United States, coupled with the more recent work of demonstration vehicles in this country. An earlier type of accumulator 'bus worked by a passenger transport company in London, failed to prove remunerative to its owners, yet these and several additional electric omnibuses to the total of 15 have been in use successfully by the Brighton Omnibus Company during the past six years.

It is evident by their retention in service that the omnibuses are not unsatisfactory to their present operators. A statement made by Mr. Pescatore, of the Tudor Accumulator Company, during a discussion on electric vehicles at a London meeting of the Institution of Electrical Engineers, shows that the maintenance cost at Brighton has remained at 3d. per car-mile, exclusive of the cost of current, but including labour and superintendence. Mr. Pescatore was able also to state that the similar cost, as applicable to 60 vehicles in England and more than 600 on the Continent, over a period of seven or eight years, was 1½d. per car-mile with a small van, and 2½d. per car-mile with a 5-ton van. Another important statement made by the head of the Tudor Company is that the life of an electrically-driven chassis is quite doubled. If members of the Leeds Electricity Committee had possessed this information, we do not think they would have agreed to the recent withdrawal of a recommendation to purchase an electric car at a cost of £600. The doubling of the life of the chassis should prove a set-off to the greater first cost of the electric vehicle. An impartial statement on the question of maintenance was forthcoming from Lieut. Sladen, chief officer of the London Fire Brigade, who gave the maintenance costs of electric vehicles, without including interest or depreciation, as about 1s. a mile, while for petrol machines his figures were 1s. 3d. a mile. In view of the experience of the fire brigade and of the ambulance service of the City of London with the noiseless and non-smelling electric vehicles, it is not altogether explicable how the General Purposes Committee of the London County Council came to advise that there is not a really satisfactory battery which admits of an extended mileage being run. It is true the average journeys of the fire machines do not exceed half a mile; and those of the city ambulances are of slightly greater length. Although in the ambulance scheme which the County Council have at last adopted as a tentative measure for Greater London the cars will have to serve a radius of several miles, it is unlikely that the number of calls upon each car daily would prove beyond the resources of the electric vehicle. The stations are so few in number that a few months' experience should easily provide useful data, and perhaps convince the Council that an increase in the number of vehicles is necessary. If so, the opportunity of experimenting with the battery car, and instituting comparisons with the petrol car should not be lost.

Roads and their maintenance, the increased wear of the main arteries owing to heavy motor traffic, and the system of licensing and taxation of commercial and public passenger motor vehicles constitute an important portion of the final report of the Departmental Committee on Local Taxation, so far as concerns England and Wales. The document was issued on March 28,

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MOTOR TRAFFIC.

and its advent has been looked for by local authorities because of the announced intention of the Government to use its recommendations as a basis for apportioning the increased Exchequer grants that have long been demanded for semi-national services. Not the least pressing of these services is that of road maintenance, owing to the part that heavy motor vehicles have played in transferring traffic from the railways to the highways. The result of all the changes proposed by the Committee is that there would be a net increase in the Government subventions of about £4,700,000 in relief of local rating. The Committee make only one suggestion in regard to new sources of local revenue. It is that, considering the heavy wear and tear of roads resulting from commercial motor traffic, the whole system of licensing and taxation of trade and hackney motor vehicles be thoroughly revised with a view to its simplification and to the provision of larger contributions from these vehicles towards the cost of the roads, and to the more equitable distribution of such contributions between local authorities. Dealing with the roads, the Committee recommend that these be classified by the Road Board into main roads, county roads, and district roads, and that half the maintenance of main roads and a quarter of that of county roads be met by the Exchequer grants. It is also advised that the balance of the cost of main roads and a quarter of that of county roads be borne on county funds, the remaining half of the cost of the latter roads being charged to the highway district responsible for roads. Roads in London and county boroughs are to be classified as main roads and streets, and an Exchequer grant made in respect of main roads at the average rate per mile for the main roads in the urban portions of the adjacent administrative county or counties. The total grants estimated are: For main roads, £1,800,000, and for county, £600,000.

Criticism is likely to be evoked by the recommendations. The subject is one that, from a ratepayer's point of view, does not permit of delay. Yet if the Government are as keen upon instituting reforms in these matters as the Chancellor of the Exchequer's recent remarks in Parliament have led the country to believe, any revision of the taxation of heavy motors must be effected in the forthcoming Budget if it is to become operative this year. The time at command is inadequate to permit of proper consultation with the owners of the several classes of vehicle. These owners are not so effectively organised as private car owners are, and a number of considerations involving differential treatment will need to be determined. It is possible that in the case of owners of one type of vehicle claims will be made for such treatment, especially as it has been conceded in the case of London and the county borough roads. A logical outcome of that concession must be an acknowledgment that the greater traffic which London and the county boroughs have to provide for ensures bigger earnings for a motor omnibus. Consequently it will not be just to call upon the owner of a vehicle serving a provincial locality to pay the same amount of taxation as the metropolitan operators. The suggestion for the more equitable distribution of the motor taxes between local authorities may or may not be regarded as a criticism of the Road Board's distribution of the petrol duty. Apparently it is in order to secure a fairer distribution that the Committee are recommending that the establishment licence duties now collected by local authorities should revert to the Exchequer. The collection of these duties was only taken away from the Excise authority a few years ago. As to whether an increased grant of £2,400,000 per annum for roads will afford sufficient relief, that is a matter that only the local authorities can decide, working out the figures on the basis of the scheme suggested by the Departmental Committee. Apart from the London method in main streets of putting down 9 in. instead of 6 in. of concrete and laying wooden blocks thereon, regard must be paid to the circumstance that all the schemes of new construction to serve the heaviest conditions of traffic are but of an experimental nature. An idea of the cost to which some counties have been put is given in the fact that during the last 10 years Middlesex County Council have spent £1,350,000 on road maintenance, and that the latest scheme of Surrey County Council involves an outlay of £87,972 in remaking 26½ miles of road in the eastern end of the county with the latest asphaltic-sand compositions in layers varying in thickness from one to three and a half inches.

On another page full details are given of the motor omnibus section of the report presented by Mr. McElroy, general manager of the Manchester tramways, setting forth the results of his tour of several countries with a view to formulating means for preventing congestion of traffic. Mr. McElroy very fairly sets forth the "advantages of the motor omnibus." We should prefer to speak of the claims of the vehicle to secure inclusion in the traffic carrying of every up-to-date transportation undertaking, for to refer to advantages implies that there are also disadvantages. It would be as fair to attach disadvantages to the use of the most perfect of all conveyances—the private motor car. If given a proper track no objection can be raised to it, and that is what is happening with the omnibus on non-tramway routes in London. That Mr. McElroy did not intend to convey the meaning that any reasons advanced against the use of the omnibus must of necessity prove to be fatal objections is shown by the nature of the third paragraph of the chapter in which he treats upon "The Question of the Provision of Motor Omnibuses." It is as appended:

The selection of the most suitable vehicle depends upon the nature of the work to be done. Motor omnibuses and tramcars must be regarded as machines for doing work, *i.e.*, for carrying passengers; and, like all other machines, it is necessary, before deciding which should be adopted in any particular case, that we should first ascertain and examine in detail the nature of the work to be done.

Our surmise as to Mr. McElroy's intentions is further supported by his statement that the attention he has given to "disadvantages" must not be construed as in any way minimising the importance of the omnibus development which has taken place in recent years, nor to place in the background the part which motor omnibuses are destined to play in the future as a means of surface transit for urban and suburban passenger transport.

"In Manchester and the surrounding districts," he adds, "omnibuses will in the future form an important part of the surface-transit facilities, particularly where the extension of the tramway system is rendered financially impossible, owing to the heavy outlay in permanent-way construction." As the report is written

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MOTOR TRAFFIC.

for the guidance of readers who do not claim an expert knowledge of the two methods of transit, he may be excused for having enumerated the difficulties which prevent the adoption of any suggestion for the substitution of omnibuses for tramcars on a heavy traffic route. The only circumstances under which this change might be deemed advisable would be, in our opinion, under the conditions suggested at the Municipal Tramways Conference last year by Mr. Fearnley, viz., as an experiment in lieu of the reconstruction of a worn-out tramway track. In view of the decreased number of accidents in London since the provision of side-guards to omnibuses, it may be that that body of opinion which is opposed to these vehicles running side by side with tramcars will see fit to change their views. Nobody connected with the actual running of the London vehicles has contended that they can deal with the whole traffic of a heavy tramway route. The attitude of the omnibus operators is represented by a statement made two months ago by Sir Herbert Jekyll, formerly railway secretary to the Board of Trade, and now a director of the allied transit companies. It was to the effect that tramcars were suitable for the heavy traffic, and omnibuses for pick-up traffic. As matters stand in many London streets, pick-up traffic means traffic attracted from the tramways, but in the provinces the two classes of vehicle could be run by one operating authority. Under such auspices the tramcars would have scope for making through fast journeys until reaching a point where it is necessary to secure fresh passengers to render the remainder of the run profitable. Mr. McElroy does not disclose every possible use which he discerns for the omnibus. He remarks: "There are other directions I have in mind where omnibuses, operated in conjunction with the tramway service, will enable us to afford greater facilities." Would it not be possible to relieve main tramway routes by finding alternative streets by which roughly to parallel the former by omnibus services?

HALLEY'S INDUSTRIAL MOTORS.

At the ordinary general meeting of the shareholders of Halley's Industrial Motors (Limited) held at Glasgow, Mr. Jackson Millar, presiding, said that the company had enjoyed another successful year, the profit being, roughly, £2,500 more. They had written off against depreciation of buildings and plant the ample sum of £4,512, and notwithstanding that the new buildings and plant had been in use only about a conple of months they had depreciated these items to the same extent as their older buildings and plant. They had fnrther increased the reserve fund by £8,000, raising it to £32,000, very nearly equal to half the total issued capital, and after paying a dividend of 15 per cent. for the year they were carrying forward, subject to bonuses to employees and directors' fees, £8,928. The extensions of the works and their equipment with plant and tools were completed in October, and consequently the accounts now before the meeting had benefited only to a very small degree from the increased capital, but they hoped that the accounts for the current year would reflect a considerable benefit therefrom. The current year had opened most auspiciously. Orders were coming in in large numbers, and they had again had to institute a night shift in order to cope with the work. Business had come to them from all quarters, both home and abroad, and they had during the past year devoted considerable sums of money and much care towards providing for the development of their over-seas trade.

Mr. George H. Halley said the commercial vehicle of the motor trade was just in its infancy, and he thought that before long the commercial trade would rival the pleasure car trade. He had ascertained from the order book for 1913 that their repeat orders during the past year amounted to well over 40 per cent. of the total sales.

Mr. Jackson Millar and Sir Archibald M'Innes Shaw were re-elected directors.

STREET ACCIDENTS IN 1913.

The Home Office have issued the appended return, showing the number of accidents during the year 1913 on the highways of the United Kingdom in comparison with the four preceding years:

	Killed	Injured.	Total.
1909	1,151	16,872	18,023
1910	1,327	21,750	31,077
1911	1,557	33,653	35,210
1912	1,764	36,833	38,597
1913	2,099	42,544	44,643

Accidents in 1913 attributed to the various classes of vehicles were as follows:

	Fatal.	Non-fatal.
Motor cars, motor vans, etc.	971	18,497
Motor omnibuses	226	3,722
Electric tramcars	178	6,708
Horse omnibuses	7	66
Horse-drawn tramcars	—	40
Other horse vehicles	717	13,511
Total	2,099	42,544

A similarly arranged return of fatalities for the past four years gives the following figures:

	1910.	1911.	1912.	1913.
Motor cars, motor vans, etc. ..	478	633	751	971
Motor omnibuses	82	117	199	226
Electric tramcars	112	123	135	178
Horse omnibuses	15	10	7	7
Horse-drawn tramcars	1	4	—	—
Other horsed vehicles	639	670	672	717

ACCIDENTS IN LONDON.

In the Metropolitan Police District and the City of London the figures relating to fatal and non-fatal accidents for five years past were as appended:

	Metropolitan Police District.		City of London.	
	Fatal.	Non-Fatal.	Fatal.	Non-Fatal.
1909	287	11,731	16	1,354
1910	348	12,493	19	1,363
1911	385	13,849	25	1,405
1912	514	15,291	24	1,360
1913	579	18,365	17	1,210

A classification of the various vehicles causing the accidents in the whole of the London area gives the following results:

		1913.	1912.
Motor omnibuses	Fatal	190	182
	Non-Fatal	3,583	2,828
Tramcars ..	Fatal	58	37
	Non-Fatal	3,053	2,231
Other vehicles ..	Fatal	187	171
	Non-Fatal	7,174	6,316

Liverpool in 1913 recorded 1,765 accidents (including 33 fatal); Birmingham, 1,546 (44 fatal); Manchester, 1,085 (41 fatal); and Glasgow, 845 (40 fatal).

DIRECTION POST COMPETITION.

Fifty-nine entries were received in connection with the competition for designs for direction posts and plates, arranged by the International Road Congress last year, with a view to securing a standard type suitable for general adoption by highway authorities. The following awards have been made: (1) E. S. Sinnott, M.Inst.C.E., county surveyor of Gloucester, £16. (2) W. and F. Wills, Limited, Perseverance Works, Bridgewater, £12. (3) W. Weeks and Son, Limited, Perseverance Works, Maidstone, £7.

Society of Motor Manufacturers and Traders.—The building at 88, Pall Mall, S.W., adjoining the Royal Automobile Club, has been completed, and the Society of Motor Manufacturers and Traders, Limited, have taken possession of their new offices.

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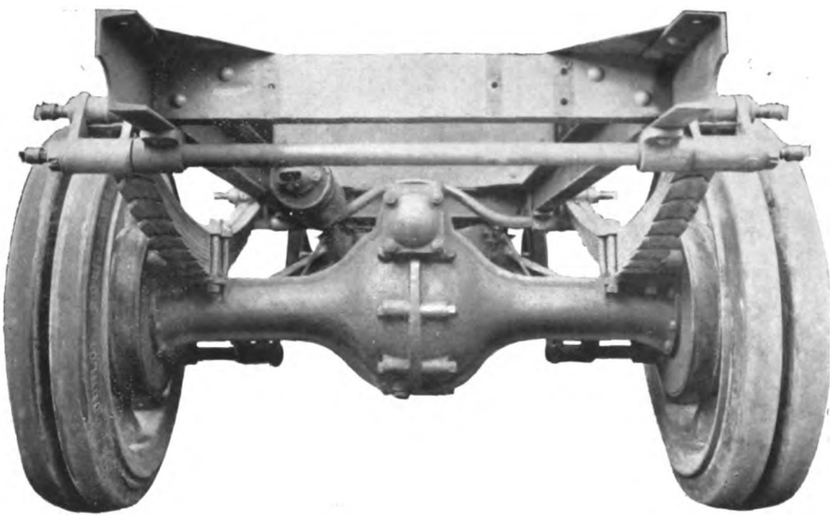
MOTOR TRAFFIC.

"ORIGINAL BERNA" NEW CHASSIS.

A new type of chassis designed for a net load of 2½ tons has just been placed on the British market by John Yarwood and Company, Limited, of Bramber Road, Fulham, sole concessionnaires for Great Britain and the Colonies of the original Berna motor vehicles. As will be seen from the illustration, the rack and pinion drive, which has hitherto been a distinguishing feature of all Berna machines, has in this model given place to a worm driven back axle of excellent design. The substantial character of the differential case is well worthy of special attention. It is built up mainly of cast steel, and is reinforced at both ends by a steel forging, which is machined up and inserted rather more than halfway of the case on each side of the differential. The flange of the forging is then bolted up to the flange cast on the steel casing, and, as will be seen in the illustration, the steel forging carries the ball bearings for the road wheels.

Ample ball bearings are provided for the worm drive, and the same remark also applies to the thrust bearings. The chassis, although extremely strong for its load of 2½ tons, is by no means cumbersome, and owing to the extra long back springs (5 ft. 3 in. in length) is exceptionally easy riding. Internal expanding brakes are fitted to the road wheels, operated by a hand lever which has an efficient compensating arrangement. The foot brake acts upon a drum situated immediately behind the gear box. A 28-30 H.P. engine of the latest



Worm-Driven Back Axle, Original Berna.

Olten design is fitted, and the gear box gives four speeds, with a direct drive on the top speed. The latest addition to the original Berna models is well worthy of the reputation which has been built up both in this country and on the Continent by the excellent performance of these machines.

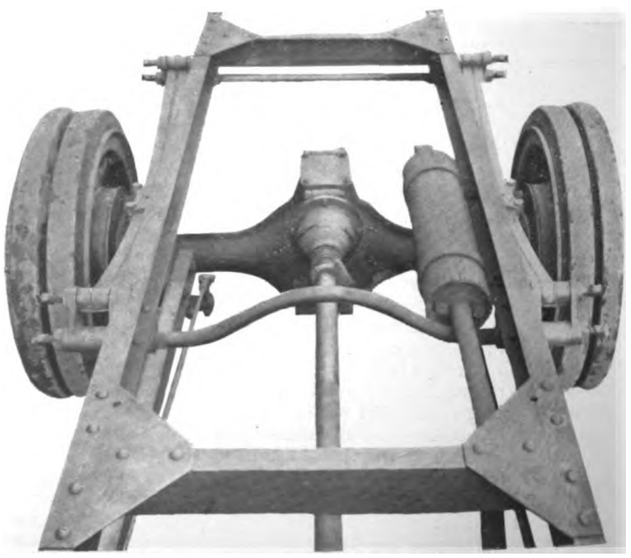
One of the points which the manufacturers of the original Berna chassis consider of great importance is the fact that for its weight it is exceptionally strong and can withstand rough usage to an extraordinary extent. This quality was well illustrated by an accident which occurred on Tuesday, March 31, a few miles outside Horsham to a 5-ton lorry owned by the Diamond Motor Spirit Company. Apparently by an error of judgment on the part of the driver, the lorry, with a net load of 4 tons 10 cwts. on at the time, slipped over the soft ground at the side of the road and landed into a ditch full of water. Owing to the nature of the ground it was quite impossible for the lorry to extricate itself, but after being pulled out by a traction engine, without any of the load being removed, the lorry was able at once to continue its trip through the principal towns on the South Coast, the only damage it had sustained being to the rear mud-guard. Our illustration gives a good idea of the position of the lorry when in the ditch.

NEW OMNIBUS SERVICE FROM SHEFFIELD. Mr. A. R. Fearnley, the general manager of the Sheffield Tramways, has submitted to the committee a report suggesting the institution of a motor omnibus service to Dronfield. The Dronfield Urban Council supports the suggestion, and, subject to the consent of other Councils concerned, a service is to be started between Woodseats tramway terminus and Green Lane, Dronfield. The maximum fare will be 3d.

Original Berna 5-Ton Lorry in a Ditch.

ALCOHOL MOTOR FUEL COMMITTEE.

The Hon. Arthur Stanley, M.P., chairman of the committee appointed by the Imperial Motor Transport Committee to investigate the possibilities of alcohol as a fuel, has issued a preliminary report. The committee state that the problem would seem to be the production of some mixture of alcohol with an existing fuel, this mixture being suitable for use in the existing type of engine, and serving materially to increase the total fuel supply during the transition period while the present type of engine is being gradually modified to suit the new conditions. The problem as regards the Empire overseas is regarded as in some respects less complex, since the number of internal combustion engines in use is not so great, and it would, therefore, be more feasible to encourage immediately the use of types designed to suit the new fuel. Denaturing is possibly one of the most important aspects of the subject, and the report suggests that the committee might offer prizes for new methods of manufacture of methyl alcohol, the synthetic production of pyridine, or for other contributions to this class of work. Ultimately the question of denaturing the alcohol will have to be discussed with the Home and Dominion Governments, with a view to a mutual agreement as to the smallest quantity of the cheapest and most satisfactory denaturant which these governments will allow in a fuel alcohol to be sold on the open market. Reference is also made to the importance of the question of raising crops for alcohol to the agricultural community throughout the Empire.



Front View of the Rear Axle, Original Berna.

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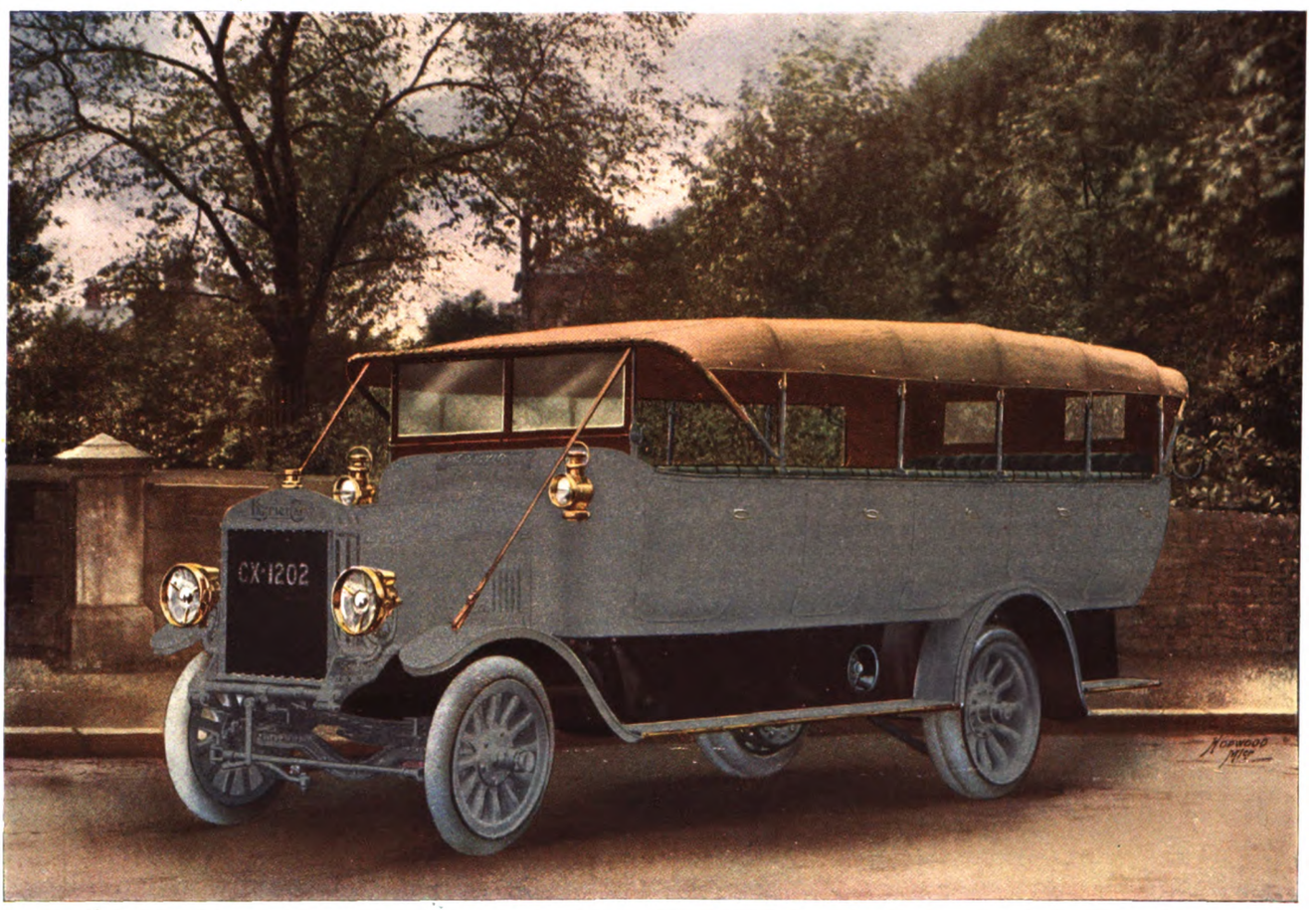
MOTOR TRAFFIC.

A NEW TOURING CHAR-A-BANCS.

The development of touring excursions by road in this country has led to great advances in the motor vehicles now so largely employed, and there are to be found in this type of service to-day some of the finest and best built public cars of large weight and power.

Although more usually of the char-a-bancs single-deck form, as befits what are as a rule summer runs in the neighbourhood of pleasure resorts, there are also very many, both single and double deckers, working all the year round, and doing excellent service for the public, with good profit to the operating company.

A fine-looking example of the former class is shown in the annexed illustration, which represents a 35-40 H.P. torpedo char a-bancs from the works of Messrs. Clayton and Company (Huddersfield), Limited, Union Works, Huddersfield. Messrs. Clayton use for their motor vehicles the generic name of "Karrier" cars, and the particular model now reproduced is the PB/60 type, designed to carry 22 passengers in addition to the driver.



Clayton and Company's 35-h.p. "Karrier" Torpedo Char-a-Bancs.

The engine has four cylinders of 4½ in. bore, with 6 in. stroke, and is rated at 35 H.P., though capable of developing up to 40 H.P. The cylinders are cast in pairs, with enclosed valve tappets, the cylinder covers being readily removable, as there are no fittings in front to hinder accessibility, a point that does not always receive the attention from designers that it deserves.

A Claudel-Hobson carburettor with a water-jacketted sleeve is fitted as standard, and the inlet gases are led through water-jacketted passages between each pair of cylinders, thus tending to maintain the inlet gases at a constant temperature.

Forced lubrication is applied to all the main bearings by a gear pump placed at the bottom of the crank case, so that it is not required to lift as well as force the oil to the bearings. The pump can be detached by unscrewing four nuts, and there are no glands or oil pipe connections to be made.

A Bosch high-tension magneto and centrifugal water pump are driven from opposite ends of a cross shaft at the front of the engine, so that both are in readily accessible positions. The clutch is of the metal to metal cone type, and is extremely flexible, the power to the gear box being transmitted by a cardan shaft with universal joints. The gears are of the sliding type, of special steel, and provide four forward speeds and a reverse, the shafts running upon large diameter Hoffmann roller bearings throughout. The final transmission is by silent type side chains to cast-steel road wheels with tubular spokes, fitted with floating phosphor bronze bushes, and running on a fixed back axle turned from 40-ton Kirkstall steel.

The springs are of exceptional length, and designed specially for passenger service, to ensure easy riding over rough roads. The equipment of brakes has received most careful consideration, to ensure absolute reliability. It consists of two brake drums, one on each end of the differential shaft, and operated by pedal, the side lever brake acting upon two large diameter drums solid with the rear wheels themselves. Both sets of brakes are of the internal expanding type, the shoes having renewable linings, and easy means of hand adjustment. The foot brake, acting as it does upon both differential shafts, positively locks both road wheels, and eliminates any tendency for one of the wheels to slip on the differential, while it relieves the gear box and bearings of all undue strains that accompany a single brake behind the gear box. The outline of the body is neat and clean looking, continuing from a tapered bonnet to a scuttle dash and flush sides. The framing is of carefully-selected ash, with lead-coated steel panelling and aluminium moulding. The seats are spaced to afford maximum knee room, and set at a restful angle, with lace web spring cushions and back squabs, stuffed with curled hair, and upholstered in leather with roll pattern pleating.

The entire car embodies the high degree of comfort and even of luxury the travelling public not only demands nowadays, but is willing to pay for, and its popularity is shown by the large number already

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MOTOR TRAFFIC.

supplied, and now on order for this year's summer traffic. Amongst the different districts where services are using these cars, may be mentioned the following: Ulster (four for one company), Somerset, Lanarkshire, Scarborough, County Durham, Lowestoft, Devon, Cornwall, Leeds, Sheffield, and Weston-super-Mare.

"Karrier" cars are also supplied of 45-50 H.P., to seat 28 to 34 passengers, the design of which is upon the lines of the above, and Messrs. Clayton and Company (Huddersfield), Limited, are also making a speciality of live axle chassis in addition for next season's models.

ASSOCIATED OMNIBUS COMPANY.

The report of this London Company for the year ended December 31 last stated that the net receipts were £5,960 and expenditure (rents, rates, etc.) £2,421, leaving a trading profit of £3,539. After adding interest on investments £226, profit rentals £149, transfer fees £18, and deducting interest on debentures £3,733, there was left at credit of profit and loss £199, compared with a trading loss of £3,826 in 1912, and £2,547 in 1911. The first mortgage debentures had been further reduced by £2,698 purchased and extinguished. At the annual meeting on March 19, the chairman, Mr. H. Clinch, said that the net profit was small, and the result of the year's working had been disappointing. On the motion for the adoption of the report and accounts being put, it was defeated. The board, however, had received proxies to the amount of 246,853 votes, and on this announcement the opposition took no part in the poll, and the report and accounts were adopted.

Important statements were made by members of the board in reply to criticisms. The chairman observed that traffic receipts had not been all that could have been desired, and while the London General Company had shown good results, their working expenses were lower than those of the Associated Company.

Mr. P. W. Tibbs (managing director) said they had expected a much better result when they issued the circular in 1912 dealing with the arrangement with the London General. It was, however, impossible to compare themselves with the London General, whose working expenses were so extremely low that they could show much better results than any other company in London. The pooling arrangement amounted to the Associated Company getting, on their 50 omnibuses, the average earnings of all the omnibuses run by the London General Omnibus Company, so that it did not matter to them whether they ran on good routes or on bad routes.

Mr. H. Byrne said that they were certainly financed by the London General Company, but if the directors had not entered into that arrangement the debenture holders would have been in possession. The directors were desirous of approaching the London General Company with a view to securing some modification of the arrangement, but the attitude taken by the shareholders rendered it very difficult, as the London General would claim that they had not the support of their shareholders.

LONDON SLOW TRAFFIC REGULATION.

On March 10 the London County Council adopted a by-law to apply generally throughout London, providing that every person driving any vehicle moving at a slow pace should, as far as practicable, keep the vehicle on the left side of the street and close to the kerb, and that every person offending against the by-law should be liable to a penalty not exceeding 40s. The Local Government Committee in reporting on the matter said that they had for some time been considering the question of the Council making a by-law under section 23 of the Municipal Corporations Act, 1882, and section 16 of the Local Government Act, 1888, dealing with obstruction to traffic caused by slow-moving vehicles. As far back as 1898 the Commissioner of Metropolitan Police issued a circular stating that his attention had been drawn to the manner in which heavy carts and wagons were driven along the centre of the streets, thereby causing obstruction to all lighter traffic, and that the police had been instructed to direct drivers of heavy vehicles to keep to the near side as far as possible. The Royal Commission on London Traffic in their report stated that all slow vehicles should be required to keep as close as practicable to the kerb. The recent Select Committee on motor traffic also expressed the opinion that a by-law dealing with the matter should be immediately passed. The Local Government Committee had communicated with the Home Secretary, who suggested that the by-law should apply to a limited number of carefully selected streets only, but he had now intimated his willingness to agree to a by-law to apply generally throughout London.

PASSENGER AWARDED DAMAGES.

PASSING OF TRAMCARS BY OMNIBUSES.

At the West Riding Assizes on March 20 Charles Lewis and his wife sued Samuel Binnington, of Hull, for £1,000 damages, in respect of injuries received by Mrs. Lewis as the result of being knocked off the footboard of a tramcar by a motor omnibus belonging to the defendant. It was stated that Mrs. Lewis was a passenger on a Hull tramcar on September 13 last, and was about to alight at Walton Street when the omnibus came up from behind the tramcar and struck her, knocking her down and inflicting severe injuries, maiming her for life. Plaintiff alleged that the omnibus was driven at great speed, passing the tramcar on the wrong side, and that the driver of the omnibus gave no signal of his approach.

For the defence, it was contended that there was no negligence on the part of the driver, that he did not pass too near the car, and that with reasonable observation plaintiff could have seen the omnibus coming. Contributory negligence on the plaintiff's part was also alleged. Mr. Shortt, K.C., for the defendant, said the driver was justified in passing the car as he did, as it was only reasonable to suppose that no one would attempt to alight from the car while another vehicle was passing. The omnibus was going very slowly indeed, and Mrs. Lewis must have staggered and fallen against it. In his evidence the driver of the omnibus said he saw Mrs. Lewis with a child on her arm standing on the platform of the car, but he did not see her attempt to alight.

The jury awarded £450 damages, and judgment was entered accordingly.

LONDON TRAFFIC LECTURE.

Mr. John C. Mitchell, treasurer to the Underground Railways of London and the London General Omnibus Company and allied undertakings, has prepared a lecture on "London Transit," illustrated with a unique series of lantern slides. He has delivered the lecture to meetings at the United Wards Club of the City, and the Bartholomew Club, when it provoked animated discussions on various aspects of the traffic question. Mr. Mitchell mentioned that the group of undertakings controlled by or allied with the Underground Electric Railways Company of London was considerably larger and more important than all the rest together, and last year these undertakings carried over 1,000,000,000 passengers, and employed something like 25,000 men. The units of electricity consumed were well over 350 millions, and the quantity of coal required was upwards of 450,000 tons. The quantity of motor spirit and petroleum used was on the way towards 20 million gallons, and the capital employed was about £84,000,000. With regard to the tramways, the London County Council and 13 other authorities were operating in Greater London. That undoubtedly led to great wastefulness.

GRIMSBY TRAMWAY COMPANY'S CHARS-A-BANCS.—In the illustrated reference to a Daimler char-a-bancs of this company in our issue dated March 12, Wells Cathedral was mentioned inadvertently instead of Lincoln.

LICENCES REFUSED AT MORECAMBE.—On March 16 the Morecambe Council, by 18 votes to 4, rejected a resolution proposed by Alderman Brown for the granting of licences to a local motor company to run a a service of omnibuses between Morecambe and Lancaster. It was pointed out that two months ago the Council refused to grant a licence to another applicant, and a month later reversed the decision.

MOTOR MUSEUM AT THE CRYSTAL PALACE.—Sir David Burnett, ex-Lord Mayor of London, on March 12 opened the museum of historical motor cars and cycles which has been established in the Crystal Palace. Sir David mentioned that they expected the purchase of the Palace for the public would be completed early in the summer, and had good authority for saying that in a few years the Palace would be connected with the Underground Railways. Among the exhibits is the first Lanchester car, which took part in the run to Brighton on November 14, 1896, to celebrate the freeing of drivers of motor vehicles from the law requiring a man with a red flag to walk in front. Another exhibit is the first London motor cab, which was built in 1897 by Mr. W. C. Bersey, who presented it to the museum. It has solid rubber tyres of no greater thickness than those now used on horse vehicles. King Edward rode in this cab from Marlborough House to Buckingham Palace.

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MOTOR TRAFFIC.

MANCHESTER AND OMNIBUSES.

CONCLUSIONS DRAWN FROM MR. MCELROY'S TOUR.

Extracts are given elsewhere in this issue from the report which Mr. J. M. McElroy, general manager of the Manchester Corporation Tramways, has issued on the tour undertaken last summer by himself and Mr. Mattinson, the permanent way engineer, to certain cities in the United Kingdom, on the Continent of Europe, and in America, for the purpose of studying passenger transportation facilities and reporting thereon for the guidance of the Tramways Committee.

In the course of the report references are made to the motor omnibus systems of Paris, New York, and London. Than the latter place, Mr. McElroy states, there is no other city in the world so favourably circumstanced for the working of motor omnibuses. From the passengers' point of view, the main advantages of the motor omnibus over the tramcar in London, to quote the report, are :

(*a*) That its mobility enables it to run practicallv anywhere. Narrow and congested streets are not shut against it, and it gives the through service which the tramcar is unable to do.

(*b*) It can maintain a slightly higher average speed than the tramcar, and this appeals to the increasing desire on the part of the public for more rapid transit.

(*c*) It can set down and pick up passengers at the footpaths, thus avoiding the danger which is experienced in boarding and alighting from tramcars.

To these advantages should be added : (1) Its elasticity as to route, (2) the absence of rails and electric equipment in the streets, (3) the fact that each omnibus is an independent unit, and (4) that it is comparatively noiseless. If to all the above advantages it can be established that the motor omnibus can be operated at an equal, or, probably, at a less total cost per mile run than the tramcar, then, *prima facie*, it might appear that the tramcar is likely to become a "back number" at an early date.

DIFFICULTIES ON HEAVY PASSENGER ROUTES.

But herein lies the danger of drawing conclusions from insufficient data. None of our passenger statistics has been put to greater misuse, and wrong deductions drawn therefrom, than the "cost per mile run."

Motor omnibuses and tramcars must be regarded as machines for doing work, *i.e.*, for carrying passengers; and like all other machines it is necessary, before deciding which should be adopted in any particular case, that we should first ascertain and examine in detail the nature of the work to be done. The report proceeds to consider the question of operating the Palatine and Rochdale Roads routes at Manchester by motor omnibuses, and to ascertain the effect as compared with the services run by tramcars. It is stated that at a point in Rochdale Road, where observations were taken, the tramcar service is one car in every 40 seconds during the "rush" traffic. If motor omnibuses were adopted in lieu of tramcars, a 20-seconds' service would be required to meet the demand, assuming that each omnibus had its complement of passengers inside and outside. If, however, only the inside seats were occupied, as they would be during inclement weather, the necessary service would be one in 10 seconds—practically necessitating a long string of omnibuses nearly the whole length of Rochdale Road from Queen's Park to town.

It may be suggested that inasmuch as omnibuses attain a slightly higher average speed than tramcars, this should modify the above conclusion, but the main reason why omnibuses attain higher average speeds than tramcars is that less time is occupied in loading and unloading. On the Rochdale Road route, however, where there are so many through passengers travelling to town in the mornings, and there is little unloading until the city centre is reached, it is very unlikely that omnibuses could give higher average speeds than the tramcars.

One of the difficulties we experience in providing adequate services to meet the "peak" loads in the mornings is connected with the manning of the cars. We cannot employ men for one or two hours a day for the working of the extra cars put in service for the "rush" traffic, and we have to adopt other expedients to meet the difficulty. If omnibuses were substituted for the large cars now in service, the provision of the necessary crews for the number of extra omnibuses required would be a serious problem.

USES TO WHICH OMNIBUSES MAY BE PUT IN MANCHESTER.

The above observations must not be construed as in any way minimising the importance of the motor omnibus development which has taken place in recent years, nor to place in the background the part which motor omnibuses are destined to play in the future as a means of surface transit for urban and suburban passenger transport. My object has been to examine the traffic characteristics and requirements in particular cases as they exist to-day, and to see how operation by motor omnibuses in these cases would compare with tramcar operation, having specially in mind the traffic problem we are now attempting to solve.

In Manchester and the surrounding district, motor omnibuses will, in the future, form an important part of the surface-transit facilities : they will supplement the tramway services in many directions, and particularly in the outlying and thinly-populated districts, where the extension of the tramway system is rendered financially impossible owing to the heavy outlay in permanent way construction. There are other directions I have in mind where motor omnibuses, operated in conjunction with the tramway service, will enable us to afford greater facilities for the travelling public.

The tramway department last year paid the sum of £30,650 in rates to the city in respect of the rails laid in the streets. It also keeps in repair and maintains practically half the width of the principal highways, at a cost of about £30,000 per annum.

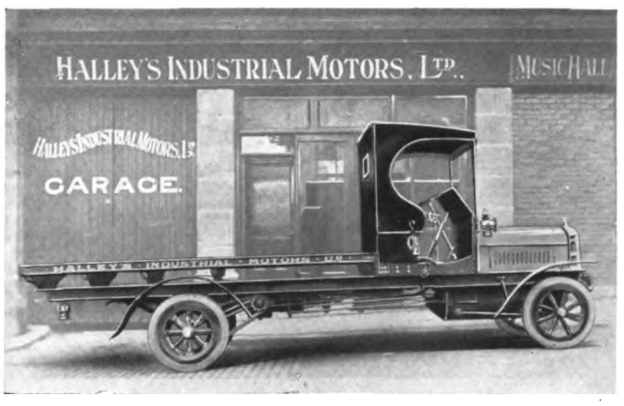
If the tramway system were operated by motor omnibuses, the financial benefits to the city in respect of rates and maintenance of roads would disappear, and a large number of omnibuses required to meet the traffic demands would add to the cost of street maintenance, and thus increase the expenditure of the highways department.

Side by side with the development of the motor omnibus, the trackless trolley cars have undergone, and are still undergoing, considerable improvement; and whilst they lack the great elasticity as to routes which the motor omnibus provides, there are circumstances which may warrant their introduction in outlying areas, especially if the operating costs continue to be lower than those of the omnibus, which seems likely to be the case.

HALLEY DEPOT AT NEWCASTLE.

Users of Halley vehicles in the district will be interested to learn that the makers of their machines have just opened an extensive garage and repair depot in Newcastle-on-Tyne, at 31, Bath Lane, where not only a full and competent staff of mechanicians (trained at the Yoker works of the company) will be permanently employed, but a very full stock of spare parts will be carried. In order to facilitate repairs and renewals, a complete plant of machine tools has been installed, as well as a forge and all the other appliances necessary efficiently to carry out repair work of every kind.

This new depot will only undertake work on Halley vehicles, and although it would at first sight appear unbusinesslike to refuse repairs to any make of machine, the policy of confining their attentions exclusively to the products of their own factory results, as can well be



understood, in greater satisfaction to Halley users, and it is solely for the convenience of their supporters that the Halley Company have opened their new premises in Newcastle.

As far back as May, 1912, a branch of Halley's was started in this city, and the many orders that have resulted are, of course, the direct reason for the repair depot. The office of the Newcastle branch, hitherto at 27, Grey Street, has been moved to 31, Bath Lane, also, and the progressive spirit of the company should be fully repaid by the confidence local users will have in getting repairs done not only efficiently and cheaply, but what is often of paramount importance, quickly.

The new premises, which are lit with electric light, have sufficient floor space to accommodate 10 vehicles, and coincident with the opening of the repair depot is the permanent installaton of a Halley B. type 3-ton lorry for demonstration purposes. The photograph shows the premises in Bath Lane, with the new demonstration vehicle in the foreground.

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MOTOR TRAFFIC.

COMMERCIAL MOTOR DEVELOPMENTS.

"Some Recent Developments in Commercial Motor Vehicles" was the title of a paper read by Mr. Thomas Clarkson at a meeting on March 24 of the Institution of Civil Engineers. Mr. Clarkson observed that during the period which had elapsed since the subject of motor vehicles was last reviewed before the Institution remarkable developments had taken place in this department of engineering, both in regard to the quality of the vehicles, and in the magnitude of their operations for the transport of passengers and merchandise. The period reviewed in this paper has witnessed the evolution of the motor omnibus as it exists to-day. Greater facilities for the transport of passengers in cities are constantly in demand. Electric rail motors, both on the surface and underground, have met this demand to some extent; but the motor omnibus has already demonstrated its superiority over the rail car or tram.

Complete flexibility is obviously impossible in motors dependent upon an extraneous power-station; the vehicles must be self-contained, and the power generated from within. The author regards flexibility as the key to the successful solution of the street-traffic problem in cities. By reason of the extent of the subject, it is scarcely possible within the limits of a paper to do more than select for examination some typical examples of the commercial motors of the present day, and consider the suitability of various types of motor to the diverse conditions of industrial transport. There are at present three methods of generating power for commercial motor transport, namely, by internal-combustion engines, by steam engines, and by electric motors. Each of these methods has found a fairly clearly-defined field of utility.

The internal-combustion motor far outnumbers the other types of motor for net loads up to three tons. For heavier duty than this, the steam motor continues to hold the field. The rise in the price of petrol has directed attention to other liquid fuels for the internal-combustion motor, and the steam motor using solid fuel is being adapted for loads less than three tons, with the object of checking the ever-growing demand for motor spirit. The electric vehicle supplied with energy by a storage battery has made remarkably little progress in England.

Relative Fuel Costs of Petrol and Steam

The petrol motor is confined to the employment of a volatile liquid fuel. The steam motor may use either liquid or solid fuels. The relative cost of the two systems for fuel per mile is, of course, governed by the ratio between the cost per pound of fuel and the mileage per pound The fuel cost for a 3-ton petrol commercial vehicle, with petrol at 1s. 4d. per gallon, and at eight miles per gallon, works out at 2d. per car-mile. The London petrol omnibus, which may be taken as equivalent to the 3-ton commercial vehicle, costs about 1d per car-mile for fuel. This lower fuel cost, it should be explained, is not due to superior engine efficiency, but is the result of an exceptionally favourable contract for the purchase of petrol in very large quantities. The present cost of fuel for London petrol omnibuses is, therefore, abnormal from the point of view o the ordinary user of petrol commercial vehicles.

The steam omnibus at present cost for liquid fuel 1·875d. per mile, which is a little less than the cost of the ordinary petrol 3-ton vehicle. The steam omnibus, or 3-ton lorry, using coke, costs for fuel 0·4d. per mile with coke at 19s. per ton. The significance of this economy, and the real value of an apparantly small reduction in cost per mile is indicated by the fact that ¼d. per mile represents, approximately, £200,000 per annum on the cost of running London omnibuses.

With regard to the relative reliability of petrol and cars, it has been demonstrated conclusively that with either type of motor the mileage lost from mechanical causes is extremely small, even when performing a commercial duty involving an annual mileage of 30,000 miles and more per vehicle. As regards the cost of mechanical upkeep, there does not appear to be any reason for a material difference between the two systems under this heading when they are run under similar conditions of management. The light steam 3-ton vehicle using coke as fuel may be regarded as combining the speed and handiness of the petrol motor, with a fuel cost equivalent to petrol at 4d. per gallon. The paper gave details of the construction of present types of both steam and petrol omnibuses, and dealt particularly with modern methods of omnibus illumination. The important question of the construction of road wheels most suitable for commercial motors of from 30 cwt. to 3 tons capacity was dealt with, and the present position of the electric commercial vehicle considered in relation to other types of motor, particularly with reference to the investigations of working costs which have been recently conducted by the Massachusetts Institute of Technology. The author concluded with a reference to modern steam motor wagons and tractors.

MOTOR WAGONS FOR THE LONDON COUNTY COUNCIL.

At the meeting on March 31 of the London County Council the Highways Committee, in a special report, dealt with tenders for the supply of motor wagons for the tramway department. The report stated that very large quantities of rails, ballast, stone, and wood paving, cement, etc., had to be conveyed to different parts of the tramway system in connection with the renewal and repair of the permanent way. Owing to the increasing amount of work to be done, it had become necessary to adopt more rapid and efficient means of transport than that provided by the horses and carts now used. The committee were of opinion that eight motor wagons should be obtained, and the following tenders had been received, and were referred to the Highways Committee by the Council on February 3, 1914:

I.—Six 5-Ton Steam Motor Wagons.

Name and Address of Firm.	Tires. (a) Steel. £	(b) Rubber. £
Foden's, Limited, Sandbach, Cheshire	3,420	4,140
Mann's Patent Steam Cart and Wagon Company, Limited, Fenchurch Avenue, E.C.	3,642	4,302
Leyland Motors, Limited, New Kent Road, S.E. ...	3,636	4,500
R. Garrett and Sons, Limited, Leiston	3,690	4,500
Yorkshire Commercial Motor Company, Hunslet, Leeds	3,891	4,572
Clayton and Shuttleworth, Limited, Lincoln	4,110	4,830
W. Allchin, Limited, Northampton	4,200	4,770

II.—Two 2-Ton Petrol Motor Wagons.

Name and Address of Firm.	Amount of Tender. £
Alldays and Onions Pneumatic Engineering Company, Limited, Birmingham	904
J. I. Thornycroft and Company, Limited, Westminster, S.W. ...	1,002
Commercial Cars, Limited, Luton	1,050
Leyland Motors, Limited, New Kent Road, S.E.	1,056
Do. do. (alternative for 2½-ton wagons)	1,230
Dennis Brothers (1913), Limited, Guildford	1,090
J. and E. Hall, Limited, St. Swithin's Lane, E.C.	1,126
Albion Motor Car Company, Upper Rathbone Place, W.	1,134
Daimler Company, Limited, Coventry	1,183
Wolseley Tool and Motor Car Company, Limited, Birmingham ...	1,399

Included in the tenders are provisional sums of £5 for each 2-ton wagon, and £10 for each 5-ton wagon, which would only be expended if required. The committee said that the works and the vehicles made by the lowest tenderers had been inspected, with the result that they recommended the acceptance of the lowest tender in each case. They proposed that the vehicles shall be fitted with resilient tires, and the total expenditure involved would thus amount to £5,044 11s. (including £70 for extra works if required). No portion of the expenditure would be incurred during the financial year 1913-14, and provision therefore would be made in the capital estimates for 1914-15.

It is estimated that at least 40 horses and carts will be displaced by the use of the motor wagons. The daily cost of a horse and cart has been 8s. 11d., while for hiring horses and carts the charge varies from 9s. 6d. to 10s. a day. For some time past it has been necessary to hire 20 horses daily at a cost of £10. By the substitution of motor traction it is estimated that a saving of £5 1s. 8d. a day will be effected, and that the total annual saving will amount to £1,525. The space that is at present occupied for the stabling of the horses is much needed for storage purposes. The committee therefore recommended that eight motor wagons should be provided for use in connection with the renewal and repair of the permanent way, and that the tenders of Foden's, Limited, amounting to £4,140, for the supply of six 5-ton steam motor wagons fitted with rubber tires, and that of Alldays and Onions Pneumatic Engineering Company, Limited, amounting to £904 11s., for the supply of two 2-ton petrol motor wagons, be accepted.

Foden's, Limited, is to be allowed to sublet to Herbert Morris, Limited (or to such other person or firm as may be approved by the chief officer under the contract), the jib cranes required in connection with the supply of the six 5-ton steam motor wagons. Alldays and Onions Pneumatic Engineering Company, Limited, are likewise to be allowed to sublet to the Atlas Resilient Steel Wheel Company (or to such other person or firm as may be approved by the chief officer under the contract) the steel wheels required in connection with the supply of the two 2-ton petrol motor wagons specified in the foregoing resolution.

Unlicensed Omnibuses.—On April 3 the Potteries Electric Tramways Company were summoned at Stoke-on-Trent for plying for hire with four unlicensed omnibuses. It appeared that only persons who obtained tickets at offices provided along the route were carried, but the stipendiary magistrate imposed a fine of £2 and costs in one case, and £1 and costs in three other cases.

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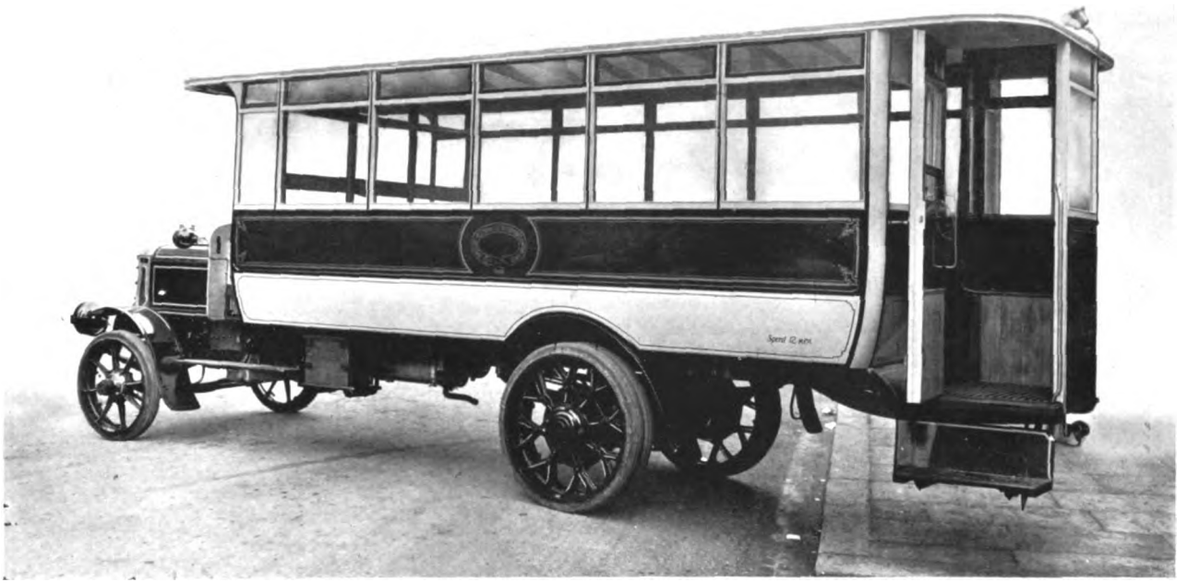
MOTOR TRAFFIC.



Daimler Omnibus at Oxford.

Commer Car Omnibus of tne London and North Western Railway.

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MOTOR TRAFFIC.

MOTOR TRAFFIC NOTES.

Mr. John Muir, well known in connection with the solid tire department of the Continental Tyre and Rubber Company, has been promoted to the position of manager of that section of the firm's business.

Mr. H. Hooton, who has joined the staff of the Continental Tyre and Rubber Company, will be remembered on account of the success with which he carried out a price-maintenance scheme some years ago, when he was connected with another important tire firm.

Stretford Prefers Tramways.—The Parliamentary Committee of Stretford Urban Council have refused the offer of Manchester Tramways Committee to run a service of motor omnibuses through the town in lieu of the tramways and light railways scheme authorised in 1903 and 1906.

Electric Steering for Motor Vehicles.—The possibility of the introduction of electric steering on motor cars, as a means of relieving the muscular effort required with the present steering wheel on long journeys over rough roads, is referred to in a recent article in an American journal, the *Electrical World*.

The Tax on Old Motor Vehicles.—The Chancellor of the Exchequer has stated that after very careful consideration he cannot see his way to propose legislation which would give an abatement of taxation in respect of old motor cars which have ceased to develop their original horse-power and substantially depreciated in value

Resilient Tire Competition.—At the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, London, E.C., may be seen a copy of the conditions (in German) of a prize of £2,000 which the Austrian Ministry of War is offering for the invention of an elastic non-rubber tire for motor lorries. Such devices as spring wheels will not be accepted. June 30 is the latest date for receiving drawings and models in Vienna.

Omnibus Services in the Dearne Valley.—In stating the reasons which led them to grant the greater portion of the application of local authorities in the Dearne Valley for powers to construct light electric railways, the Light Railway Commissioners mention, with reference to the opposition in the interests of the motor omnibuses now running, that the view of the Commissioners was supported by the decision of the Councils arrived at after careful consideration, and by the clearly expressed local opinion, that the service which they afford is not in accordance with the requirements of the case.

The Proposed Traffic Board for London.—At a meeting of the Unionist members for London on March 11, over which Mr. H. P. Harris presided in the absence, through illness, of Mr. Walter Long, the question of a Traffic Board for London was discussed. A valuable memorandum by the chairman, who served on the Select Committee last session, had been circulated. After a long discussion it was relsolved unanimouslv to urge upon the Government "That a Traffic Board consisting of three specially qualified persons should be set up without delay, to make by-laws and regulations for traffic within the Metropolitan police area."

Daimler Tower Wagon - Bradford Corporation Tramways.

Daimler Tower Wagon—Sheffield Corporation Tramways.

Electric Vehicle Demonstration.—Edison Accumulators, Limited, Mossay and Company, and the Torpedo Electric Motor Company, gave a demonstration of battery-propelled vehicles at Croydon on March 26. Both pleasure and commercial types were shown, the demonstration being arranged in view of the Board of Guardians having under consideration the purchase of a motor ambulance.

Scope for More Omnibuses at Oxford.—"We may grumble at the overcrowding—and at certain times it is certainly appalling—at the mud-splashing, and at the dust-raising (just now it is the mud-splashing that is more particularly brought home to us), but we travel in the 'buses more and more. So it looks as if they have come to stay. Clearly" (according to the *Oxford Chronicle*), "the tramway company, which is launching out into expenditure in a good many ways in connection with the 'buses, believes so."

Motor Boats for London Pleasure Parks.—At a meeting of London County Council on March 17 the Parks and Open Spaces Committee reported that in their opinion an improvement would be effected if three pleasure boats at Battersea Park, Finsbury Park, and Victoria Park respectively were fitted with detachable motor engines. The Evinrude Motor Company were prepared to supply three engines with the necessary fittings for £21 7s. 6d. each, less 15 per cent. discount, and the committee proposed that this offer should be accepted. This was agreed to.

London Omnibus Time-Tables.—In the House of Commons on March 18, Mr. McKenna (Home Secretary), replying to a question by Mr. Douglas Hall (U., Isle of Wight) said the Select Committee on Motor Traffic made careful inquiry into the question of the speed of motor omnibuses in London, and found that the time-tables were often closely drawn, and that that was a factor which tended to induce the driver to take risks. The omnibus companies could not be compelled to submit their time-tables for approval by the police or some other public body, but he would take steps to inquire whether the companies would be willing so to submit them.

Tilling-Stevens Petrol-Electric Vehicles.—W. A. Stevens, Limited, 26, Victoria Street, Westminster, had received, between January 1 and the first week in March, over 80 orders for Tilling Stevens petrol electric vehicles. Among the orders are included 40 complete single-deck omnibuses for the Birmingham and Midland Motor 'Bus Company, Limited, and five vehicles for the Maidstone and District Motor Services, Limited. Other orders include those from the Liverpool, Edinburgh, Southend, and Bournemouth Corporation Tramways, besides three repeat orders from the British Arc Welding Company, Limited, and a further vehicle for H.M. War Department. In addition to these English orders, W. A. Stevens, Limited, have also received orders from Pretoria and Durban municipalities. The firm are also filling orders for a fleet of 2-ton vehicles, as well as a 4-ton petrol-electric vehicle for the British Petroleum Company, Limited.

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THE

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

DONCASTER CORPORATION.

TRAMWAYS DEPARTMENT.

The Electricity and Tramways Committee are prepared to receive tenders for the supply of :—

1,200 tons Steel Rails (112lbs. per yard), Centre Groove type.
36 tons Steel Fishplates.
20 tons Steel Soleplates.

The Corporation are not bound to accept the lowest or any tender, and contractors tendering do so at their own cost and charges.

A charge of 10s., which will not be returned, will be made for each copy of the form of tender, specification, etc.

Form of tender, specification, and copy of detail drawing may be obtained on payment at the Offices of the Borough Engineer, 3, Priory Place, Doncaster.

Tenders, endorsed "Tender for Rails, etc.," are to be addressed to the Chairman of the Electricity and Tramways Committee, and delivered at the Office of the undersigned, before noon of Friday, April 17, 1914.

R. A. H. TOVEY,
Town Clerk.

1, Priory Place, Doncaster,
March 30, 1914.

ELECTRIFICATION OF MELBOURNE SUBURBAN RAILWAYS.

The Agent-General for Victoria, Australia, is prepared to receive tenders for :—

Overhead Travelling Cranes for Sub-Stations and Lifting Tackle for Power Station

for use in connection with the Electrification of the Melbourne Suburban Railways now being carried out.

Specification and form of tender may be obtained from Messrs. Merz and McLellan, Consulting Electrical Engineers, 32, Victoria Street, Westminster, S.W., on or after Monday, April 6, 1914. Any *bonâ-fide* tenderer requiring information in addition to that contained in the specification may apply to the Consulting Engineers, Messrs. Merz and McLellan, 32, Victoria Street, Westminster, S.W.

The charge for the specification in duplicate is £5 5s. and £2 2s. each for any further copies. Sums paid for copies will be refunded on the receipt of a *bonâ-fide* tender for the whole of the work included in the specification.

Cheques (crossed) in payment for specifications must be made payable to the Agent-General for Victoria.

Sealed tenders in duplicate, marked "Electrification of Melbourne Suburban Railways—Tender for Overhead Travelling Cranes for Sub-Stations and Lifting Tackle for Power Station," are to be addressed to the Agent-General for Victoria, Australia, and delivered at his office, Melbourne Place, Strand, W.C., not later than noon on Monday, April 27, 1914.

The Government do not bind themselves to accept the lowest or any tender, and ample security will be required from the contractor whose tender is accepted.

(Signed) PETER MCBRIDE,
Agent-General for Victoria, Australia.

CITY OF LEEDS.

ELECTRIC LIGHTING DEPARTMENT.

TURBINE ALTERNATOR, CONDENSING PLANT, ETC.

The Leeds City Council are prepared to receive tenders for a Steam Turbine Three-phase Alternator and Exciter, of 12,000 kw. capacity or thereabouts, running at a speed of 1,000 or 1,500 revolutions per minute, and Steam Turbine-driven Surface Condensing Plant.

Copies of the general conditions, specification and form of tender, may be obtained from Mr. C. Nelson Hefford, Manager of the Department, 1, Whitehall Road, Leeds, on payment of a deposit of five pounds, which will be refunded on receipt of a *bonâ-fide* tender.

The Corporation will be prepared to consider separate tenders for the different sections of the plant in accordance with the conditions attached to the specification.

Tenders must be in the form attached to the specification, and must be delivered to me at the Town Hall, Leeds, not later than 11 o'clock in the forenoon on Monday, May 11, 1914, in sealed envelopes, endorsed "Electric Lighting—Tender for Generating Plant."

The Corporation do not bind themselves to accept the lowest or any of the tenders sent in.

ROBERT E. FOX,
Town Clerk.

Leeds, April 3, 1914.

BOROUGH OF TORQUAY.

ELECTRICITY DEPARTMENT.

The Electricity Committee of the Torquay Corporation invites tenders for the following :—

Contract "S 6."

Section 1.—Two Water-Tube Boilers.
Section 2.—Fuel Economiser.
Section 3.—Steam Pipes and Valves.
Section 4.—Cast-Iron Feed Pipes and Valves.
Section 5.—Cast-Iron Feed Tank.
Section 6.—Induced-Draught Fan and Motor.

Specifications and drawings may be obtained on application to the Borough Electrical Engineer, Mr. Chas. W. Salt, Electricity Offices, Beacon Quay, such application to be accompanied by a deposit of one guinea, returnable on receipt of a *bonâ-fide* tender.

All tenders must be delivered to the undersigned not later than 12 o'clock noon on Monday, April 20.

The carrying out of the work is subject to the sanction of the Local Government Board being received to the necessary loan.

The Corporation do not bind themselves to accept the lowest or any tender.

FREDK. S. HEX,
Town Clerk.

Town Clerk's Office, Town Hall, Torquay,
March 31, 1914.

BOROUGH OF TUNBRIDGE WELLS.

The Corporation is prepared to receive tenders for the supply, delivery, and erection of the work in connection with the installation of a 300-kw. Steam Alternator and Condenser in sections :—

(A) 300-kw. Steam Prime Mover.
(B) 300-kw. Alternator and Exciter.
(C) Condenser with Air and Circulating Pumps.

Specifications, particulars, and form of tender can be obtained on and after April 1, 1914, on application to the Borough Electrical Engineer, Mr. R. N. Torpy, M.Inst.E.E., A.M.I.Mech.E., at the Electricity Works, Tunbridge Wells.

Contractors may tender for any section, but not for part of same.

The Corporation do not bind themselves to accept the lowest or any tender.

Tenders, sealed and endorsed "Tender for Electricity Works Extension, Sections.....," should be addressed to the Town Clerk, Town Hall, Tunbridge Wells, and delivered not later than 10 a.m. on April 22, 1914.

By Order, W. C. CRIPPS,
Town Clerk.

Town Hall, Tunbridge Wells.

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DUBLIN AND SOUTH EASTERN RAILWAY.

TENDERS FOR STORES.

The Directors of the above Company are prepared to receive tenders for the supply of the undermentioned Stores for 8 months from May 1, 1914.

Specifications, with form of tender, price 6d. each, can be had on application to the undersigned.

Tenders, sealed, marked "Tender for Stores," and addressed to "The Secretary, Dublin and South Eastern Railway, Westland Row Station, Dublin," to be sent in so as to reach him not later than 10 a.m. on April 27, 1914.

1. Iron.
2. (a) Iron Castings. (b) Steel Files, &c. (c) Carriage Bolts. (d) Permanent Way Fastenings. (e) Tin and Lead.
3. (a) Paints, Oils, &c. (b) Varnishes.
4. (a) Oils (Lubricating). (b) Oils (Burning). (c) Tallow. (d) Chandlery.
5. (a) Ropes, Canvas, &c. (b) Wagon Covers.
6. Brushes, Brooms.
7. (a) Cotton, Waste, and Wicking. (b) Soft Goods.
8. (a) Cloth and Carriage Trimmings. (b) Carriage Furniture.
9. Ironmongery.
10. (a) Glass. (b) Leather.
11. (a) Native Timber. (b) Foreign Timber.
12. (a) Slates, Tiles, &c. (b) Cement.
13. Indian Rubber.
14. Plumbing and Gasfitting.
15. Carbide of Calcium.

A. G. Reid,
Secretary.

Secretary's Office,
Westland Row Station, Dublin,
April 4, 1914.

MANCHESTER CORPORATION TRAMWAYS.

The Tramways Committee of the Manchester Corporation are prepared to receive tenders for the supply and delivery of a Power-Driven Rail Bending Machine.

Specification and form of tender may be obtained on application to Mr. J. M. McElroy, General Manager, Corporation Tramways, 55, Piccadilly, Manchester.

Tenders are to be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, endorsed "Tender for Rail Bending Machine," and must be received not later than 10 a.m. on Tuesday, April 21, 1914.

The Committee do not bind themselves to accept the lowest or any tender.

Thomas Hudson,
Town Clerk.

Town Hall, Manchester,
April 3, 1914.

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Tramway Engineers,
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THE SANITARY WOOD PAVING
REGISTERED TRADE MARK. M.J.
Telegrams: "Jarrah, London." Telephone: 368 London Wall.

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Deutsche Ackley Bremsen Co., m.b.H. Charlottenburg 4-Berlin, Waitzstr. 7.
Cie. Francaise des Friens Ackley, 62, Rue St. Lazare, Paris.
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SATURDAY, APRIL 11, 1914.

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MOORGATE STREET, LONDON, E.C.

LONDON TRAMWAY FINANCIAL RESULTS.

The estimate of the financial results of the working of the London County Council Tramways for the financial year ended March 31 last, which was presented at last Tuesday's meeting of the Council by Mr. R. C. Norman, Chairman of the Finance Committee, is sufficiently serious, but there is no need for great alarm for the future. It may be recalled that for the year ended March 31, 1913, the tramways were able to do no more than pay working expenses, interest on capital, and contribution to sinking fund. That result came about owing to increased omnibus competition, which produced a large reduction in traffic receipts. During the year just closed, the corner was turned in regard to traffic receipts and, according to the latest figures, which come down to March 25 last, the receipts for the whole year, less six days, stood at £2,165,811, which was an increase of £20,276 over the corresponding period of the previous year. The working expenses have, however, gone up still more, owing, no doubt, to the greatly increased services, to higher wages, and other causes, including the loss of £70,000 on workmen's fares, and the estimate for the year is that £91,000 will have to be drawn from the reserve fund to make good the expected deficiency. In neither year can anything be added to the renewals fund. But the position is by no means so bad as some of the newspaper comment would lead the public to believe. In the first place, an emphatic contradiction must be given to the statement of a writer in a newspaper, alluding to the deficiency, that the omnibus is quicker and safer than the tramcar. It is only quicker if it exceeds the speed beyond which a tramway car is allowed to travel, or if it runs for long distances without stopping. The allegation of safety is based on the assertion that it puts down its passengers at the kerb. Evidently the writer referred to uses a motor car—not a motor omnibus. The latter, except at fixed stopping places, frequently stops elsewhere than at the kerb. It would also be interesting to know where the safety is when the omnibus begins to skid about on greasy streets, or mounts the kerb. The omnibus for the moment is in a fairly strong position, and does not need to be bolstered up with fictitious claims. It is not difficult to sketch the probable future of both classes of vehicles so far as London is concerned. The tramways will gradually improve their position, first by being linked together so that dead-ends at busy points will be abolished; second, by an increasing use of trailer cars, which will add to revenue at much smaller additional expense; third, by having to pay an annually diminishing sum for interest on capital. These are more or less certainties. Among beneficial changes which are only very probable are the extension of the tramways into highly remunerative districts from which they are now excluded, and the freeing of the undertaking from the whole or part of the liability for street paving maintenance which is done at the expense of the tramways for the benefit of omnibus and other traffic. As to the omnibus, it is now probably at its zenith. It would never have been able to compete with the tramways at all had it not a monopoly of the City and West End—enormously lucrative districts from which tramways are excluded. One has only to watch a suburban route where both omnibuses and tramcars run to see that bad as the position has been made for the tramcar, the case of the omnibus financially is worse. The boasted dividend of 18 per cent. rests on a margin between revenue and expenditure of only .374 of a penny per 'bus-mile, or .066 of a penny per passenger. In the expenditure is included depreciation, renewals fund contribution, and interest and redemption of debentures. It is the smallness of the capital required which enables the dividend rate to be large. There can hardly be a doubt that the price of petrol and other motor fuel will steadily tend upwards. Nor can it be doubted that a charge will be imposed on the omnibus for road maintenance. A thoroughly equitable charge of the sort would wipe out the whole, or nearly the whole, of the present profits. When justice is done, the omnibus will have to confine itself to districts where it is needed, instead of spreading itself over territory which is amply served by a better form of traction which pays its way in more than one sense of the expression.

MEDICAL EXAMINATIONS.

Reference was made in last week's issue to the adoption by Hull Corporation of a medical examination for new candidates for employment in the tramways department. The Committee's recommendation was adopted by a very large majority, and the opponents were chiefly members who presumed to act in the interest of the working classes generally. Their arguments were so weak as not to be worthy of recapitulation, and Hull is to be congratulated upon having come into line with other leading tramway undertakings. Perhaps if the objectors had known something of the effect of physical examinations in other places they would have been spared the ordeal of being made to look ridiculous in the eyes of the public. One result of the scrutiny by medical men is that the candidates for employment who pass the test set about their duties with greater confidence. A circumstance which renders an examination more necessary now than heretofore is that under the National Insurance Act the benefit societies accept men for membership without the medical test upon which most of the organisations previously insisted.

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Consequently there are now more men entering the labour market without any knowledge of whether or not they are suffering from serious organic defects. The responsibilities placed upon employers under the Workmen's Compensation Act are in themselves all-sufficient reasons why the wage earners should not be predisposed to accident risks. Above and beyond the foregoing considerations, it is necessary for the safety of the public, both car passengers and street users, that the men placed in charge of every stage carriage should be certified to be free from such defects as are likely to lead to accidents. The risks arising from such causes are very real, and seeing that the Board of Trade are the authority primarily responsible for the safe working of tramways, it is surprising that they have not brought the question of medical examinations to the attention of the proprietors. For candidates for the post of motormen a clean bill of health is even more desirable in some respects than it is for men in the national Services or the police force. The railway companies recognise this by subjecting their drivers to periodical tests, as well as on the occasion of promotions. The wisdom of examining all the car employees not only before engaging them, but also periodically, was strongly urged by Dr. Chapman, vice-chairman of Manchester Tramways Committee, in the paper which he contributed to the London Conference of the Municipal Tramways Association in 1909. Perhaps an even stronger case was advanced by Dr. Collie, the medical examiner to the London County Council, as the result of his extensive experience, and support for the entrance examination was forthcoming from the chairman of the Leeds tramways and the managers of the Glasgow and Manchester undertakings, on each of which it had been introduced some time before. Members of Tramways Committees who have not yet instituted an examination would be well advised to peruse the report of Dr. Chapman's paper and the discussion thereon.

FINANCIAL POSITION OF L.C.C. TRAMWAYS.

Effect of Autobus Competition.

Mr. R. C. Norman, chairman of the Finance Committee, submitted the annual estimates to the London County Council on Tuesday last. Dealing with the financial position of the Council's tramways undertaking, he said that the prospect deserved serious attention. For the first time the undertaking had failed to provide out of the revenue of the year the full amount required for the redemption of debt, and the reserve fund would be drawn upon to the extent of £91,705 to make good the deficiency. The reserve fund had been built up out of surplus revenue of previous years, and after meeting the deficiency would amount to £181,851. It would not be possible to carry anything at all to the renewals fund, which after meeting the renewals expenditure for the past year would amount to £548,713. The original estimates had been altogether falsified by the results, as were those of the previous year. The current estimates could only be regarded as a rough guide. The traffic receipts were estimated at 9d. a car mile, slightly more than the figure earned last year, and on this basis the estimates showed there would be a deficiency of £46,682 and no provision for renewals; this deficiency would again be met out of the general reserve fund. The unsatisfactory results of the past year and the uncertainty as to the future were due in the main to the competition of the motor 'buses. It was hoped that the running of trailer cars, the lowering of fares, and other efforts to meet the convenience of the public would have had a favourable influence on earnings; but it did not appear that the measures adopted had so far produced much improvement in the financial position. The Highways Committee thought that the linking up of dead-ends and minor extensions might lead to a more efficient and more remunerative service. The Committee's difficulties were only part of a wider question; the competition was also severely felt by other tramway undertakings and by the railways which served the area of Greater London. This had led to a general demand that the motor 'buses should be required to pay such a contribution to local funds as would lessen the handicap of taxes, rates on track, and road maintenance, and would also go some way towards meeting the heavy additional cost for roads thrown on local authorities by the new form of traffic. There was the further question as to whether it was desirable on financial grounds to allow the existing unlimited competition between motor 'buses and rival forms of traffic to continue. The undoubted advantages of competition might be purchased too dear. A Select Committee of the House of Commons and the Council itself were in favour of some authority being set up which would have jurisdiction over all competing forms of locomotion with a view to regulation in the public interest, and the Council had decided to press for legislation in this respect. Parliament was fully alive to the urgency of the problem. It was proposed that the number of motor 'buses should be limited, and the licence materially changed. At present, the licence was little more than a certificate of structural suitability. He thought they must look in the future for some limitation of competition in this public service.

Sir John Benn, as one who had had a large share in the creation of the Council's tramway service, was extremely gratified to think that the undertaking had weathered the gale, and that notwithstanding unparalleled opposition it still remains the chief means of locomotion for the people of London. The tramways would survive until under sympathetic management and municipal policy they would not only be of greater service to London, but resume their previous financial position. He quoted Birmingham, Leeds, and Manchester to show the relief that could be obtained for the rates from revenue-producing undertakings.

The estimates are to be further discussed on June 30.

L.C.C. TRAMWAY MATTERS.

Appointment of a Consulting Engineer.

At last Tuesday's meeting of the London County Council the Highways Committee reported that they had considered the desirability of arrangements being made to afford the chief officer of tramways additional assistance in connection with the electrical engineering of the tramway undertaking, particularly in view of the important development contemplated at Greenwich power station. The chief officer had pointed out that it would be of great assistance to him to obtain at the present time the services of some well-known expert to advise on certain aspects of the work connected with the extension of the station, particularly from the point of view of steam consumption, which, having regard to the limited space available at the power station and other considerations, was a matter of very great importance. The Committee had accordingly been in communication with Sir Alexander Kennedy, the well-known expert on steam production plant and electrical work generally, with the result that Sir Alexander had offered through Messrs. Kennedy and Donkin to advise generally on any question connected with engineering at the generating station for the tramway undertaking as to which the Council might desire to consult him.

Messrs. Kennedy and Donkin were also prepared to act as engineers for the specifying and superintending of such new plant or work as the Council might place in their hands. The terms would be:—(1) A retaining fee of £500 a year to cover all references, reports, and consultations; (2) as regards new work Messrs. Kennedy and Donkin to be paid a commission of 5 per cent. on all certificates for plant, etc., up to £50,000 a year and 4 per cent. on expenditure over this amount. As regarded new constructive work connected with the second stage of the extension at Greenwich power station which was carried out substantially to specification already prepared by the chief officer of tramways, the commission to be 3 per cent. If the arrangements on these lines were come to Sir Alexander Kennedy would give the work his personal attention, and would himself attend before the Committee or the Tramways Management and Constructive Sub-Committee when desired. The Committee, in recommending acceptance of this arrangement, pointed out the great difficulty of the work, particularly in view of the conditions under which it had to be carried out.

Thermit Welds for Rail Joints.

It was estimated, the Committee stated, that 1,500 rail joints would require to be welded on the tramway tracks to be renewed during the year 1914-1915. Thermit, Limited, were prepared to supply the welding portions of the joints at 19s. 6d. each, and would in addition supply 7½ additional welding portions free of cost for every 100 ordered by the Council. In other respects the company were willing to renew their existing contract with the Council of May 1, 1913. The Committee had arranged for an agreement embodying the terms to be entered into.

Failure of Tramway Extension Projects.

In reference to the proposals made in the Council's Tramway Bill of this session for extension of the tramways from Farringdon Road to near Ludgate Circus, from Aldgate to near Mark Lane Station, and from Aldgate to Aldgate Station, the Committee reported on the negotiations which had taken place with the City Corporation. With regard to the first of the schemes mentioned, the Corporation desired the execution of a widening of Farringdon Road, but it was pointed out that the cost would be prohibitive. As regarded the extension from Aldgate to Aldgate Station, representatives of the Corporation stated that they were not disposed to advise consent. A letter had now been received from the Corporation refusing consent to the three schemes. This meant that the first and third extensions could not be proceeded with. As regarded the one from Aldgate to Mark Lane Station, the consent of the Corporation was not essential, as more than two-thirds of the route was in the borough of Stepney, and that authority had consented to the proposal.

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ARE RENEWALS CAPITAL EXPENDITURE?

In connection with the making of a rate at the March meeting of Gloucester Council the Mayor stated that the Light Railways Committee had been under the impression that they had exhausted their borrowing powers, and that unless provision was made by way of a reserve fund, the ratepayers might be suddenly confronted with expenditure of anything from sixpence to a shilling for renewals. The Town Clerk now advised that they had power to borrow under the existing Order to the amount of £125,000, of which only £105,000 had been taken up. Therefore he proposed to move the reduction by £1,000 of the amount of £4,450 for the light railways included in the estimates—Councillor Langley-Smith, in supporting the motion, said it was only owing to the vigilance of a member of the Finance Committee, who dealt simply with an inclusive amount for light railway purposes, that the matter had been brought to notice. Two years ago the Light Railways Committee obtained £750 from the rates for setting up a reserve fund, and last year £250 was taken. It had been proposed to ask for £1,000 this year for the same purpose.—Councillor Colwell, of the Light Railways Committee, said there were at least ten years more life in the rails. The committee were already meeting out of revenue renewals in overhead equipment, rolling stock, and the track. When any large amount was required for rails it should be borrowed.—Councillor Collett said that the Order only authorised borrowing on account of capital expenditure, and he doubted whether that could be construed as a sanction to borrow for renewals.—Councillor Roberts (chairman of the Light Railways Committee) believed that the policy of building up a reserve was a wise one, but the committee gladly accepted the ruling of the Town Clerk that they had unexhausted borrowing powers. Renewals of overhead equipment and rolling stock were being met out of revenue, but in ten or twelve years they would be called upon to relay the track, and that might be a matter of £20,000.—Councillor Bibby urged the Council to take the opinion of experts on the matter, but the motion for the reduction of the estimate was carried.

MISCELLANEOUS NEWS AND NOTES.

All-Night Service for Glasgow.—The Tramways Committee have adopted the recommendation of the sub-committee to institute an all-night service of cars forthwith.

A Company Carrying Blind Workers Free.—The Tramways Company have informed Smethwick Council that they will issue free passes on the tramways to blind workers.

Additional Cars for Newcastle.—The Council have sanctioned the borrowing of £12,240 to meet the cost of purchasing 15 additional tramcars with vestibule fronts and covered tops.

Omnibus Project at Wigan.—The Tramways Committee have appointed a sub-committee to start an experimental motor omnibus service from Coppull to the tramway terminus at Standish.

Russian Railway Electrification.—At an outlay of 15 million roubles the Baltic and Warsaw railways are to be converted to electric working. The work is to be begun early in next year.

Trail Cars in Montreal.—Twenty-five trail cars have been put into service by Montreal Tramways Company during the past three months for the purpose of relieving the congestion in the rush hours.

Electric Vehicle Association of America.—Mr. A. J. Marshall has been appointed permanent secretary of this association, with offices in the New York Engineering Societies' Building, Thirty-Ninth Street, New York.

Football Traffic at Glasgow.—The England versus Scotland football match at Hampden Park, Glasgow, on April 4 created a new record for a Saturday in the tramway receipts. The amount taken was £5,074, as against £4,438 at the international match two years ago.

An Extension Sanctioned at South Shields.—It was agreed by the Council on April 1 to extend the tramway system within the borough boundary, at a cost of £8,000. A profit of £4,000 over the previous year is reported as the result of the past year's trading.

Leeds Railless Extension Scheme.—While the Wharfedale Rural Council have decided to support the Leeds Corporation's project for installing railless trolley cars from Guiseley to Otley and Burley, the Menston Parish Council have expressed opposition, but would approve of a tramway or motor omnibuses.

Plant Required at Belfast.—As a means of providing for the traction and lighting load until a larger generating station can be provided, the Council have adopted a recommendation by Mr. Bloxam, the electrical engineer, to call for tenders for installing a 1,000 kw. storage battery, etc., at an estimated cost of £10,800, and £1,000 for buildings.

Track Maintenance.—Newport Council have approved of an agreement arrived at between the Tramways Committee and the Works Committee with regard to the maintenance of the permanent way. Councillor Moxon, chairman of the Tramways Committee, has stated that the agreement will be the means of effecting economy, and introducing advantageous conditions.

Bombay and Railless Traction.—Mr. F. C. Rimington, general manager, Bombay Tramways and Electric Supply Company, has informed the Bombay Development Commission that in his opinion motor omnibuses cannot be profitably operated to meet the problems he has to face. The company, he adds, would be willing to install the railless trolley system on certain routes if a public demand for it can be shown.

The Coventry Chain Company have just issued a handbook on chain gearing, specially devoted to the engineering application of the Coventry "noiseless" chains, which is so full of useful information that it should be in the hands of all those interested in the transmission of power by chain drives. The handbook will be sent free on application to the company's works at Coventry.

New Railways for China.—The Board of Communications and the British and Chinese Corporation, Limited, have signed an agreement for the construction of, roughly, 600 miles of railway from Nanking to Nanchang and Ping Siang. The chief engineer, the accountant, and the traffic manager will be British. The materials will likewise be British. A loan of £8,000,000 is to be raised for railway purposes.

An Aid to Smooth Working at Portsmouth.—For the third time in four years the police football team defeated eleven tramwaymen in the annual match for the cup presented by Sir Wm. Dupree, who presided at the dinner to which he subsequently entertained the teams and friends. Mr. W. R. Spaven, the tramways manager, and Councillor Timpson, vice-chairman of the Tramways Committee, were among the speakers.

Toast Rack Cars and Omnibuses for Wallasey.—The Corporation are considering a scheme to extend the New Brighton promenade and to construct tramways from New Brighton Pier to Wallasey Village. This would give a circular route throughout the borough. It is proposed in the summer to run open cars along the great length of sea front. Powers are to be obtained to run omnibuses to Leasowe and other places, which are popular during the summer.

Newcastle Tramways Committee's Protest.—In consequence of the local justices having dismissed a charge of alleged assault on a conductor by a man who was warned not to board the car after it had started, the chairman of the Tramways Committee brought the matter before the committee. That body adopted a resolution calling the attention of the Home Secretary and the Board of Trade to the matter, so as to show what little support the committee received from the magistrates in trying to prevent overcrowding.

Wallasey Penny Stages Not to be Extended.—Two years ago the Council extended several of the penny stages on the tramways, and after a twelve months' trial the old distances were reverted to. Colonel Greene, the manager, reporting on memorials in favour of a universal penny fare and a notice of motion to again extend the distances, recently stated that any extension in the stages would more than swallow up any excess of revenue this year. By a majority of three the Council on April 2 decided against a change being made.

Improvements in the Mallins Car.—Several cars embodying an improvement in the double staircase type of body devised by Mr. C. W. Mallins, the general manager, are being placed in service on the Liverpool tramways. While retaining the double staircases, the vestibules have been made more commodious, and very wide aisles have been provided on both decks, while there is ample space between the transverse seats. The wheel base has been increased to eight feet, and in some instances to nine feet. This has enabled provision to be made for 80 passengers, or ten above the accommodation of the ordinary cars. The improved body is carried on a single truck, which is said to be free from oscillation, and to be very safe in passing points.

The Inside of a Top-Covered Car.—At Lambeth police court a tramcar conductor was summoned by the police for carrying six passengers in excess of the authorised number. It was said that the excess number were standing in the top-covered saloon instead of "inside the carriage" as authorised on certain occasions. The solicitor to the man's union contended that with a top-covered car there was no outside except the platforms, and on the application of the police the case was adjourned. On April 2 Mr. Barker (for the police) said that the Council gave an assurance some time ago that the conductors would not be allowed to carry excess passengers in the upper saloon. Mr. de Grey, the magistrate, ruled that the inside included the upper saloon and dismissed the summons.

Cardiff Rejects Halfpenny Fares.—By 19 votes to 14 the Council on April 6 defeated a proposal by a councillor in favour of halfpenny stages. The proposer stated that inquiry showed that in towns of about 120,000 population halfpenny fares were not a financial success, but in towns and cities approximating in size to Cardiff, where the halfpenny stage was half-a-mile, halfpenny fares had been a success. Sir John Courtis, chairman of the Tramways Committee, stated that in 1913 28,365,277 passengers were carried, and of these 24,334,185 were penny passengers, over 86 per cent. These penny fares brought in £118,108 out of the total of £128,883. An alteration such as that proposed would result in a loss if only 30 to 40 per cent. paid halfpenny fares. At present the profits were £20,000.

Montreal's Transportation Problem.—On the ground that matters at stake were too large to be dealt with by the Montreal Council in their remaining three weeks in office, the consideration of the tramways question by the special committee was on March 17 adjourned *sine die*. The Mayor reported that as the result of past conferences the Tramways Company had improved the service in the centre of the city, it being understood that the outlying districts would have to wait until the congestion in the centre had been abolished. Alderman McDonald remarked that among the questions to be considered was whether the city should own subways? If so, was it in a position financially to do so? The question of receiving a portion of the earnings had to be considered, and also whether one or two companies should control transportation in the city.

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MEMORANDUM ON GLASGOW FARES.

In reporting on suggestions for various concessions Mr. James Dalrymple, the general manager, points out that a little over two years ago the Corporation inaugurated the long halfpenny ride. It would be unfortunate, he thinks, after steering clear of the rocks and shoals that had wrecked many another municipal tramway undertaking throughout the country that the committee should, on the completion of 20 years' successful operation, now take a step which they might afterwards wish to retrace. The last reduction—namely, the doubling of the halfpenny stage—had been, so far as the increase in the number of passengers carried was concerned, very successful. For 1909-10, the year immediately preceding the last two changes in fares, 222 million passengers were carried. They were now carrying nearly 340 millions. In order to cope with this increased traffic they had built 50 additional cars, and were about to start on another lot of 150, which would bring the total up to 1,000. The question which was now being asked was :—" Where are we to find room for all these cars in the streets? " If they did not get other main arteries through the centre and across the Clyde the congestion would become intolerable.

When the last change was made on the length of the halfpenny ride the end of the two stages from the centre of the city just brought them short of the gathering grounds for the great mass of the regular penny passengers. Should the halfpenny fare now be extended to cover three stages, which would carry a passenger about a mile and three-quarters from the centre, it would, to a very great extent, wipe out the present penny passenger, and as they could not live without the penny passenger it would be necessary to capture him somewhere else. Of course were the halfpenny distance extended to cover three stages instead of two, it would follow that the penny distance would cover six stages instead of four, and that nine stages would require to be given for 1½d., and twelve for 2d. They estimated that their total traffic revenue this year might reach £1,075,000. Should the fares be reduced as indicated he estimated there would be a drop in the gross revenue of £173,500. He thought, however, that there was certain to be a very considerable increase in the number of passengers carried. It would take an additional 42 million 1d. passengers to make up the drop in revenue caused by the above all-round reductions. He was quite unable, however, to say what the increase in passengers was likely to amount to, or to estimate what number of additional cars might be required to cope with the traffic. He was not prepared to say that the department, from a financial standpoint, could not face this suggested reduction of fares. The most serious aspect of the question was the resultant congestion of traffic.

NEW AND PROSPECTIVE WORK.

Aberdeenshire.—A committee of the Aberdeen County Road Board has been appointed to consider a scheme submitted by Messrs. Macqueen and Findlater, agents for the Scottish Light Railways and Development Syndicate, Limited, for a light railway from Turriff to Maud Junction. The cost was estimated at £2,330 per mile.

Dover.—Repairs and renewals to tramway tracks are to be carried out this year to the amount of £1,500. As soon as possible afterwards the sum of £2,000 is to be expended on the same object.

Manchester to Bolton.—Salford Tramways Committee have consented to confer with the Swinton and Pendlebury, Farnworth and Kersley, and Barton-on-Irwell Councils on the subject of connecting Manchester and Bolton by tramway by linking up the tramway systems of Manchester and South Lancashire. Only a short stretch of trackless road beyond Pendlebury separates the two systems.

New South Wales.—The Budget for the current year allows for an expenditure of £10,867,000 on railways, tramways, and other works.

Oldham.—An increase of coal consumption at the electricity works having been caused by the breaking down of the turbine, the chairman of the Electricity Committee has urged the expenditure of £30,000 if need be on new machinery, in order to bring the figure down to 3lb. of coal per unit.

Reading.—The Tramways Committee have requested the general manager and engineer to report on the questions of purchasing a motor tower wagon, and of doubling the single lines of tramway between Oxford Road and Wokingham Road termini.

Walsall.—The General Purposes Committee have recommended that powers be obtained in the Walsall Corporation Bill, now being promoted in Parliament, for extending the proposed trolley vehicle and motor omnibus route from Cannock as far as Hednesford, an additional distance of 2 1-6 miles, involving an additional capital expenditure of £7,000. It is also proposed to borrow £2,092 for the purposes of the electricity undertaking, £1,092 being in respect of the provision of a chain-grate stoker and a new economiser.

CONTRACTS AND ORDERS.

United Electric Car Company have obtained an order for ten top covers for tramcars from Bolton Council.

Cammell, Laird and Co. have received a contract for the supply of car wheel tires to Gloucester tramways.

General Electric Company have received an order from Manchester Council for Augold magazine lamps for street lighting.

Burton Tramways Committee have placed the following contracts :—C. King and Co., uniforms; H. Perry, caps and straw caps.

Siemens Bros.' Dynamo Works have received a contract for the annual supplies of Tantalum traction lamps to Manchester Corporation tramways.

Rotherham Council have awarded the appended contracts :—Turbo-alternator, the British Westinghouse Electric and Manufacturing Company, Limited, £7,025; rotary converter, British Thomson-Houston Company, Limited, £2,755.

Burton-on-Trent Council have placed contracts as follows :—Turbine, British Westinghouse Electric and Manufacturing Company, Limited, £4,793; switchboards, British Westinghouse Company, £370; pipework, Aiton and Co., Limited, £203.

Dick, Kerr and Company's tender for track renewal and reconstruction work during the year ending March 31, 1915, was recommended for the acceptance of Belfast Corporation, but by 16 votes to 14 the proposal was referred back to the Tramways Committee for reconsideration.

London and North-Western Railway Company have awarded a contract for the supply of eight natural draught cooling towers for their power station at Stonebridge Park to Balcke and Co., Limited. The plant, which is in connection with the electrification of the suburban lines, will have a capacity of two million gallons of water per hour.

Bradford Council have allotted contracts as subjoined for new plant at the Valley Road generating station :—E.H.T. switchgear, Ferranti, Limited, £684; L.T. switchgear, British Westinghouse Electric and Manufacturing Company, Limited, £193; four 4,000 amps. automatic circuit breakers, British Westinghouse Electric and Manufacturing Company, Limited. £332; two cooling towers. Davenport Engineering Company, Limited £4,904; three induced draught fans, Musgrave and Co., Limited, Bolton, £1,250.

Walthamstow Council have adopted tenders for annual supplies to the tramways and electricity department as follow :—British Westinghouse Company, J. W. Rowlands and Co., W. Wood and Co., Anti-Attrition Metal Company, Limited, L. Andrew and Co., Equipment and Engineering Company, Limited, and Imeson and Finch, car accessories; Electrical and Manufacturing Supplies, Cryselco Company, Limited, and the General Electric Company, lamps; C. C. Wakefield, Stern Sonneborn Oil Company, A. B. Gross and Co., and Vacuum Oil Company, lubricating oil and grease.

W. T. Henley's Telegraph Works Company have secured a contract for supplying and laying the whole of the cables required in the electrification of the suburban system of the Buenos Ayres Western Railway. It is said to be the largest railway electrification scheme yet undertaken. It will be remembered that the same firm secured a similar contract in the electrification of the suburban lines of the Central Argentine Railway, the cables for which are now in course of installation. The work for the Buenos Ayres Western is to be completed in 16 months. Messrs. Livesey, Sons, and Henderson, and Messrs. Merz and McLellan are the consulting engineers for the railway company. In a later issue we hope to give full particulars of the installation.

Salford Council have placed contracts for biennial supplies to the tramways department with the following among other contractors :—Car accessories (electrical), British Westinghouse Company (approximate value £1,080), General Electric Company, C. Macintosh and Co., Micanite and Insulators Company, Manchester Armature Repair Company, W. Boydell and Sons, and Tramway Supplies, Limited; car accessories (mechanical), Brown, Bayley's Steel Works, Brecknell, Munro and Rogers, National Rail and Tramway Appliances Company (£1,132), Tramways Supplies, Limited, Watlington and Co., John Baker and Co. (£1,625), and British Hele-Shaw Patent Clutch Company (£943); special car accessories, British Westinghouse Manufacturing Company and Dick, Kerr and Co.; special paints and varnishes, Nobles and Hoare, Limited, and Docker Bros.; cars, frogs, pull-offs, A. Wiseman, Limited, Brecknell, Munro and Rogers, Watlington and Co., B.I. and Helsby Cables Company, and British Westinghouse Company; special overhead equipment, B.I. and Helsby Cables Company. Annual supplies :—Insulating materials, Siemens Bros. Dynamo Works (£684); petroleum, British Petroleum Company (£106); petroleum and petrol, Anglo-American Oil Company, Limited (£684).

PERSONAL.

Mr. John Aldworth, general manager of Nottingham Corporation tramways, has been voted by the City Council an increase in salary from £900 to £1,000.

Sir Salter Pyne is on a tour in India in the interests of the R.E.T. Construction Company, for whom Messrs. Gladstone, Wyllie and Co., Calcutta, are the agents in India.

Mr. A. Redfern, assistant electrical engineer at Darlington, has been presented by the staff with an oak writing desk on the occasion of his departure to take another appointment.

Messrs. J. Telfer and **F. V. L. Mathias,** general manager and electrical and tramways engineer respectively, Warrington Corporation tramways, have been awarded increases of salary.

Mr. S. Joyce Thomas has been appointed a member of the Highways Committee of the London County Council in succession to Mr. H. Didiard, who has resigned his position on the committee.

Mr. W. S. Murray has been appointed by the New York, New Haven, and Hartford Railroad Company to be consulting engineer in general charge of all electrical engineering and construction. He will continue with the firm of McHenry and Murray in general consulting practice.

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Mr. C. H. Merz, who was engaged in July, 1913, to advise the London County Council on the electricity supply of the county, has presented his report to the Special Committee on London Electricity Supply. It will be ready for circulation to members of the Council on April 15, and at the same time it will be placed on sale. Among the questions dealt with are:—(1) The existing means of supply; (2) an outline of a complete scheme for Greater London and the County of London; (3) a definite recommendation as to the initial steps to be taken in the direction of a complete scheme, bearing in mind the existing conditions and the general financial position. It is understood that Mr. Merz expresses the view that any change made in the present system should be in the direction of unifying the supply and distribution.

Mr. E. Carden's work as general manager of Dover Corporation tramways was strongly defended by Councillor E. Chitty, the chairman of the committee, on a proposal by Councillor Baker to reduce the tramway estimates by £100. It was true, the chairman said, that the undertaking would be losing something like £2,100 this year, but that was not Mr. Carden's fault. Part of the loss was owing to the excessive price for electricity. They were paying this year for renewal of rails £1,500, for which provision ought to have been made in the past. Since his appointment the manager had become responsible for a great many additional duties. It was at Mr. Carden's suggestion that they installed meters on the cars, which had effected a saving in current consumed. Comparing the figures for 1911-12 with this year's the sum of £1,400 for current had been saved. Sir A. M. Bradley pointed out that the price of current could not be reduced as the Electricity Committee had to keep the price up in order to meet their expenditure. Finally it was agreed that a sub committee of the Tramways Committee should consider the whole question of the tramways.

FINANCIAL REPORTS AND MEETINGS.

Melbourne Tramway and Omnibus Company.—The board have declared a dividend of 6d. per share for the quarter ended 31st March, and also a bonus of like amount, making together 1s. per share.

Middleton Electric Traction Company.—Lord Vaux of Harrowden presided at the annual meeting of the Middleton Electric Traction Company, on April 1, and stated that there was an increase of £1,211 in the traffic receipts, which constituted a record. He could see no reason why the improvement should not be maintained.

Brisbane Electric Tramways Investment Company.—A divisible balance of £115,848 is shown in the report for 1913. The directors place £40,000 to reserve fund (bringing it up to £50,000), and recommend a final dividend of 4s. per share, free of income-tax on the ordinary shares, making 8 per cent. for the year, carrying forward £3,123.

Calcutta Tramways Company.—The revenue for 1913, including interest on investments and deposits, amounts to £113,271, which, with the balance brought forward, makes a total of £117,807. A final dividend of 7s. per share, making 9½ per cent. for the year is proposed, transferring to reserve for depreciation, etc., £15,000, adding to the staff provident fund £1,215, and carrying forward £8,405.

Brush Electrical Engineering Company.—After providing for the general charges, etc., and interest on the debenture stocks, there remains a net profit of £20,061 for the year 1913. The directors recommend that the profit be applied as to £12,351 in writing down the property account to provide for depreciation in respect of the last two years, and as to the balance of £7,709 in reduction of the amount standing to the debit of profit and loss account.

Wolverhampton Corporation Tramways.—The results for the year ended March 31 show that there was a net increase in receipts of £2,481. The total receipts were £56,444 6s. 7d., as compared with £53,963 3s. 6d. in 1913. The passengers carried amounted to 12,616,881, an increase of 703,759, and the mileage was 1,105,326, an increase of 27,087 miles. The receipts per car mile amounted to 11.333d., an increase of .247d. The particulars relating to the motor omnibus service are as follow:—

	Miles run.	Passengers carried.	Total Receipts.	Receipts per bus mile.
1914	48,511	428,704	£2,070 15 1½	10.244d.
1913	41,559	367,579	£1,710 11 7	9.878d.
Inc. 1914	6,952	61,125	£360 3 6½	.366d.

The British Electrical Federation.—The traffic statement for the week ended April 3, 1914, shows that the receipts from tramways and railways amounted to £30,670, as compared with £36,610 in the corresponding week last year, and from omnibuses £13,968, as compared with £4,283, making a total of £53,638, as compared with £40,893. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year the receipts show an increase of £3,470 upon the week.

British Westinghouse Company.—At the annual meeting on April 6, the chairman (Mr. J. A. Bryce, M.P.) said that since the last meeting the scheme for the reduction of the capital had been sanctioned by the Courts. The net profits for the year amounted to £106,403, against £41,074 in 1912, £20,708 in 1911, and £12,436 in 1910. In 1909 there was a loss of £708, and in 1908 a loss of £7,445. After providing for debenture interest, etc., the directors had placed £50,000 to reserve, and recommended a dividend at the rate of 5 per cent. on the preference shares, carrying forward £6,403. Perhaps the most important order secured by the company was that from the London and South-Western Railway Company for train equipments in connection with the electrification of their suburban traffic. After securing judgment in their favour in the House of Lords on their claim against the Underground Electric Railways, the matter had to go back to the Hon. A. Lyttelton, the arbitrator. The Hon. A. Littelton died, and the matter was then compromised. The company saved something like £70,000 or £80,000, and instead of having to pay all the costs of the proceedings from the commencement they secured a large part of the costs. Altogether they lost from the whole business about £52,000. Some ten or twelve years ago they were doing a large business, but none of it profitable, but now all their business was of a profitable character.

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COPPER AND ALUMINIUM MARKET.

April 9, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton:—

	Thursday, April 9.	Last week.	A Year Ago
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	65 13 9	65 15 0	69 0 0
,, ,, (three months)	65 8 9	66 0 0	68 8 9
Electrolytic Copper—bars or ingots ..	67 10 0	68 10 0	72 0 0
Aluminium—bars or ingots	83 0 0	83 10 0	89 0 0

COAL MARKET.

April 9, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows:—

	Thursday, April 9.	Last week.	A Year Ago.	Two Year Ago.
			s. d.	
London, free into barge in Thames—				
Best Admiralty Welsh (large) ..	Owing to the miners' strike there are no quotations.	Owing to the miners' strike there were no quotations.	25 6 ..	Owing to the miners' strike there were no quotations.
Best Seconds			24 6 ..	
Ordinary Drys			23 3 ..	
Best Washed Nuts			21 6 ..	
Best Washed Peas			20 0 ..	
Cardiff, f.o.b.—				
Best Admiralty (large) ..			21 0 ..	
Best Seconds			20 0 ..	
Ordinary Drys			18 9 ..	
Best Washed Nuts			17 0 ..	
Best Washed Peas			15 6 ..	
Newcastle, f.o.b.—				
Best Steams			17 0 ..	
Best Seconds			14 9 ..	
Smalls			12 6 ..	

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregates. Wks.	Aggregates. 1913-4.	Increase or Dec.
Anglo-Argentine	April 1	£57,276	£55,788	13	£741,038	+ £20,607
Auckland..... (28 days)	Mar. 13	19,566	23,332	37	182,422	+ 3,227
Ballarat and Bendigo	Feb.	4,083	3,893	46	43,543	— 948
Brazilian St. Rly. Mlrs	Feb.	46,044	49,305	30	368,458	+ 57,263
Brazilian Traction.....	Mar. 28	95,467	93,743	13	1,237,892	+ 75,289
Brisbane	March	26,370	28,325	13	81,915	+ 7,375
British Columbia ..... $	Feb.	688,333	704,003	35	6,034,831	+ 352,403
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacrose	March	48,227	45,222	39	402,125	+ 7,115
Calcutta.....Rs.	April 4	68,600	68,814	13	9,53,436	+ 47,244
Cape Town	Feb	...	13,342	...	...	...
Carthagena & Herreria	March	8,695	2,425	13	8,120	— 1,952
Cordoba.....	Feb.	11,795	12,676	47	145,713	+ 12,767
East India	March	1,760	1,884	35	15,402	+ 640
Kalgoorlie.....	Feb.	2,644	2,169	8	4,509	— 779
La Plata.....	March	5,771	5,178	13	15,240	— 1,048
Lima.....	Feb.	32,206	33,880	9	71,759	+ 5,423
Lisbon ..... Mlrs.	Jan.	...	156,175	4	156 175	...
Madras (14 days) Rs.	Mar. 31	30,882	28,947	12	168,226	+ 9,821
Melbourne	Feb.	62 500	61,000	9	132 500	+ 3,000
Mexico ..... $	Feb.	329,361	553,804	9	1,133,165	+ 242,169
Montevideo.....	March	33,140	32,630	21	170,531	+ 855
Para	April 5	4,337	3,651	18	62,125	— 12,728
Port Elizabeth.....	Feb.	...	3,510	...	...	...
Shanghai ..... $	April 1	19,882	21,000	13	368,800	+ 51,282
Singapore ..... $	April 4	11,675	11,678	13	168,519	+ 9,193
Toronto ..... $	Feb.	718,313	777,648	9	1 625,628	+ 130,387
Winnipeg..... $	Feb.	320,431	350,977	9	733 648	+ 61,720

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1913-4.	Increase or Dec.
Aberdeen Corporation..	April 1	£1,442	£1,458	+ £16	44	£69 977	+ £3,908
Accrington Corp.....	Mar. 31	378	481	+ 103	52	29,743	+ 2,424
Ayr Corporation	April 4	218	253	+ 35	46	16,511	+ 2,308
Bath Electric	,, 1	1,078	781	— 297	13	9,267	— 133
Birkenhead Corp.	,, 5	1,177	1,289	+ 112	½	909	— 76
Birmingham Corp.	,, 4	11,383	12,524	+ 1,281	52	626,572	+ 53,558
Blackburn Corporation	,, 1	1,157	1,168	+ 11	1	1,168	— 10
Blackpool Corporation	Mar. 26	2,505	537	— 1,968	50	83,715	+ 10,831
Bolton Corporation.....	April 5	2,550	2,652	+ 102	1	1,936	+ 237
Bournemouth Corp.....	,, 1	1,837	1,756	— 101	52	104,353	+ 8,658
Bradford Corporation...	April 4	3.457	3,790	+ 333	1	3,790	— 340
Brighton Corporation....	Mar. 29	1.079	828	— 269	52	54,351	+ 2 ,701
Bristol	April 3	7,131	8,170	+ 1,039	13¼	98,512	+ 4,771
British Elec. Federatn.	,, 3	40,893	53,638	*	...	...	...
Burnley Corporation ...	,, 4	1,586	1,625	+ 39	1	1,625	+ 39
Burton-on-Trent Corp.	,, 5	284	284	+ 20	1	284	+ 20
Bury Corporation.....	,, 5	1,095	980	— 115	½	980	— 115
Cardiff Corporation.....	Mar. 21	2,450	2,653	+ 203	51	137,876	+ 12,453
Chatham and District..	April 2	860	916	+ 56	13	10,677	— 366
Chesterfield Corp.	Mar. 31	442	434	— 8	52	13,528	+ 1,379
Colne & Trawden.....	,, 21	323	240	— 83	11	2,846	+ 27
Cork Electric.....	April 2	470	484	+ 14	13	5 870	— 2
Croydon Corporation ...	Mar. 27	1,720	1,598	— 122	51	83,964	— 5,914
Darlington Corporation	April 4	219	257	+ 38	1	257	+ 38
Derby Corporation	Mar. 28	1,097	928	— 169	52	50,659	+ 4,101
Dover Corporation	April 4	...	137	..	½	137	...
Dublin & Lucan	,, 3	138	130	— 8	13	1,517	— 113
Dublin United	,, 2	5,905	5,794	— 111	14	70,000	+ 2,898
Dundee City	,, 1	1,238	1,252	+ 16	46	59,763	+ 3,886
East Ham Corporation ..	,, 4	1,066	1,011	— 55	52	64.040	— 2,978
Exeter Corporation	Mar. 27	398	295	— 103	52	17,320	+ 694
Gearless Motor 'Buses.	April 4	...	494	..	14	6.130	...
Glasgow Corporation ...	,, 2	20,004	21,948	+ 1,944	14	901,511	+ 63,074
Glossop(U.Elec.Supply)	,, 4	117	115	— 2	14	1 665	— 39
Halifax Corporation ...	Mar. 24	2,755	1,928	— 837	51	106,623	+ 3,270
Hastings & District.....	April 1	889	776	— 113	13	9,273	— 799
Huddersfield Corp.	,, 4	1,957	2,146	+ 189	1	2,146	+ 189
Hull Corporation	,, 4	3,009	3,172	+ 163	½	1,985	— 347
Ilford U.D.C.	,, 4	431	484	+ 53	1	303	+ 75
Ilkeston Corporation ...	,, 1	109	123	+ 14	1	123	+ 14
Ipswich Corporation ...	Mar. 23	467	380	— 87	52	23,047	+ 630
Isle of Thanet	April 4	348	375	+ 27	27	9,019	+ 284
Kilmarnock Corp.	,, 4	162	162	Nil	46	8,037	+ 484
Lanarkshire	,, 2	1,658	1,882	+ 224	13	23,974	+ 3,017
Lancashire United	,, 1	1,323	1,530	+ 207	13	19,961	+ 2,022
Leeds City	,, 4	7,557	8,163	+ 606	½	5,227	+ 1,181
Leicester Corporation...	,, 4	2,595	2,821	+ 226	14	37,542	+ 1,620
Leith Corporation	,, 4	666	692	+ 26	46	32,510	+ 1,527
Leyton U.D.C.	Mar. 26	1,466	1,252	— 214	51½	68,140	— 155
Liverpool Corporation..	,, 82	12,692	13,540	+ 848	12	158,611	+ 8,706
Llandudno &Colwyn B.	April 3	200	180	— 20	18	2,771	— 329
London County Council	,, 1	41,116	42,853	+ 1,737	51	2,208,664	+ 21,571
London Gnl. Omnibus..	,, 4	57,576	61,913	+ 4,337	14	771,720	+ 7,364
London United	,, 3	5,464	5,932	+ 434	14	72,362	— 96
Lowestoft Corporation	,, 4	138	152	+ 14	26	4,656	+ 381
Maidstone Corporation	Mar. 19	159	159	Nil	51	9,938	+ 647
Manchester Corp.....	April 4	16.727	17,631	+ 904	½	11,137	+ 1,697
Met. Elec. Trys.	,, 3	8,521	9,152	+ 631	14	113,049	— 405
Nelson Corporation.....	Mar. 30	245	260	+ 15	52	10,802	+ 562
N'castle-on-Tyne Corp.	April 4	4,416	5,055	+ 639	1	5,055	+ 639
Newport (Mon.) Corp....	,, 4	751	817	+ 66	1	817	+ 66
New St. Helens & Dist..	,, 1	675	786	+ 111	40	32,101	+ 2,825
NorthamptonCorp	,, 3	270	227	— 43	½	227	— 43
Nottingham Corp.	,, 2	1,236	960	— 326	½	960	— 326
Oldham Corporation ...	,, 5	1,962	2.184	+ 222	2	3,750	+ 4
Portsmouth Corp.....	,, 4	...	1,373	...	1	1,373	...
Preston Corporation ...	,, 1	799	851	+ 52	1	851	+ 52
Provincial	,, 4	1,781	1,816	+ 35	27	45,201	+ 1,679
Reading Corporation ...	,, 2	617	675	+ 58	½	195	+ 27
Rochdale Corporation	,, 4	1,406	1,524	+ 118	1	986	— 81
Rotherham Corp.....	,, 1	864	844	— 20	52	52,253	+ 9,468
Salford Corporation ...	,, 6	4,858	4,837	— 21	1	4,176	+ 27
Sheffield Corporation...	,, 5	7,031	7,832	+ 832	2	12,030	+ 673
Southampton Corp.....	,, 1	1,182	1,180	— 2	52	67,672	+ 3,487
Southend-on-Sea Corp.	,, 1	644	768	+ 124	1	112	+ 61
South Met. Trys.	,, 3	749	1,102	+ 353	14	13,156	+ 3,405
South Shields Corp.....	,, 4	624	700	+ 76	½	430	+ 120
Sunderland Corp.....	,, 5	1,072	1,018	— 54	1	1,018	— 54
Sunderland District ...	,, 1	589	587	+ 53	22	12,436	+ 1,057
Swindon Corporation ...	,, 1	154	164	+ 10	52	8,621	+ 454
Trys. (M.E.T.) 'Buses	,, 4	2,311	9,257	+ 6,946	14	110,794	...
TynesideTrys.&Tmrds	,, 1	437	501	+ 64	13	6,187	— 161
Wallasey Corporation	,, 4	1,046	1,160	+ 114	1	728	— 69
Walsall Corporation ...	,, 4	533	512	+ 29	14	8,262	+ 24
Walthamstow U.D.C....	Mar. 28	819	723	— 96	52	38,328	+ 1,460
Warrington Corp	,, 26	476	428	— 48	51	23,929	+ 336
West Ham Corporation	April 2	2,565	2 773	+ 207	52	142,631	+ 4,365
Wigan Corporation ...	,, 2	1,413	1,462	+ 49	52	78,000	+ 49
Wolverhampton Corp	,, 1	996	1,036	+ 40	1	1,036	+ 40
Yorkshire (W. Riding)	,, 5	1,320	1,370	+ 50	14	19,799	+ 1,010

* From such of the services as were working both last year and this year the receipts show an increase of £3,470 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London.....	April 4	£5,295	£5,005	— £290	14	£72.778	— £1,865
City and South London	,, 4	2,925	2 622	— 303	14	39,650	— 2,512
Liverpool Overhead.....	,, 5	1,637	1,635	— 2	14	22,901	+ 651
London Electric.....	,, 4	14,080	14,080	Nil.	14	204.860	+ 2,510
Mersey	,, 4	2,459	2.421	— 38	14	31.657	+ 73
Metropolitan	,, 5	16.036	17,656	+ 1,620	14	249.380	+ 22,159
Metropolitan District..	,, 4	13.307	12,927	— 380	14	185 897	+ 1,155

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TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, April 8.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	69 — 71
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	— ½	4½ — 4⅞
5	Do. 5½% Cum. 2nd Pref.	...	4⅛ — 4⅜
100	Do. 4% Deb. Stk. Red.....	...	92½ — 94½
100	Do. 4½% Deb. Stk. Red.....	...	97 —100
100	Do. 5% Deb. Stk. Red.....	...	96½ — 98½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 —106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅜ — ⅝
1	Do. 5% Cum. Pref	...	⅛ — ¾
100	Do. 4½% 1st. Mort. Deb. Stock, Red.....	+ 1	70 — 75 xd
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	+ 1	85 — 87
10	Blackpool and Fleetwood Tramroad Co.	...	14 — 15
	Bombay Elec. Supply and Trams. Co., Ord.	...	13½ — 14½
10	Do. do. 6% Cum. Pref.....	...	10¾ — 11¼
100	Do. do. 4½% Db. Stk Rd.	...	94½ — 96½
$100	Brazilian Traction Light and Power Co. Lim.....	— 1	82½ — 84½
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	...	7½ — 8
5	Do. do. 5% Cum. Pref	...	4¾ — 5⅜
100	Do. do. 4½% 1st Deb Stock, Red. ...	...	98 —101
10	Bristol Tramways and Carriage Co.	...	6¾ — 7
10	Do. do. 6% Cum. Pref.	...	6⅓ — 7⅓
100	Do. do. 4% Deb. Stock	...	100 —103
100	Do. do. 4½% Deb. Stock	...	96 — 97
100	British Columbia Elec. Ry. Co., Lim., Def. Ord. Stck.	...	117 —121
100	Do. Pref. Ord. Stock	...	105 —109
100	Do. 5% Cum. Perpetual Pref. Stock.....	...	101 —104
100	Do. 4½% 1st Mort. Debs.	...	98 —101
40	Do. 4½% Vancouver Power Debs.....	...	94 — 98
100	Do. 4½% Perpetual Cons. Deb. Stk.	...	93½ — 95½
100	British Elec. Traction Co., Lim., 6% Cum. Pref.....	...	89 — 92
100	Do. 7% Non-Cum. Pref.	...	56 — 59
10	Do. 6% Pref. Ord. Non-Cum.	...	15½ — 17½
100	Do. Deferred Ord. Stock	...	6½ — 8½
100	Do. 5% Perpetual Debenture Stock.....	...	93 — 95
100	Do. 4½% Second Debenture Stock, Red	...	79 — 82
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	73 — 78
100	Buenos Ayres Lacrosse Trams. Co., Stg. 5% 1st Mrt. Deb.	...	100 —102
5	Calcutta Tramways Co., Limited. Ord.	+ ¼	7 — 7½
5	Do do. 5% Cum. Pref.	...	5 — 5¼
100	Do. do. 4½% 1st Deb. Stock, Red.	...	96 — 99
1	Cape Electric Tramways, Ld., ...	...	⅛ — ¼
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	3 — 3½
100	Do. 5% Debs., Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co. (1904), Lim.	...	5¼ — 5½
100	Do. 4% Debenture Stock Red, 1905	...	91 — 96
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. ...	...	89 — 93
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	...	93 — 96
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	— 6⅞
10	Dublin United Trams. Co. (1896) Lim. Ord.	...	— 11⅛
10	Do. do. 6% Pref.	...	— 12⅝
100	Do. do. "A" Red. Stock	...	— 80¼ xd
100	Do. do. Deb. Stock "B" Red. ...	...	— 79
10	Gateshead & Dist Trys. Co., Ord.	— ½	8½ — 9
10/-	Hastings & Dist. Electric Trams. Co. Ld., Ord.	...	⅛ — ⅜
1	Do. do. 6% Cum.Pref.	...	¼ — ¾
100	Do. do 4½% Deb. Stk. Red.	...	65 — 70
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	93½ — 97½
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.).....	...	86 — 90
10	Imperial Tramways, Ord.	...	3 — 3½
10	Do. do. 6% Cum. Pref.....	...	6¼ — 6¾
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 6% Cum. Pref....	...	2 — 2¼
100	Do. 4% Debenture Stock	...	71 — 76
1	Kalgoorlie Elec. Trams., Ltd.	...	0 — 1/16
100	Do. do. 5% "A" Deb. Stk.	...	85 — 90
100	Do. do. 6% "B" do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.....	...	⅞ — 1
10	Lanarkshire Tramways Co.	...	9¾ — 10¼
100	Lancashire United Tramways, 5% Prior Lien Deb.	...	87 — 89
1	Lisbon Electric Trams., Lim., Ord.....	...	1½ — 1⅝
1	Do. 6% Cum. Pref.	...	1⅛ — 1⅜
100	Do. 5% Mort. Debs.	...	91 — 96
1	London and Suburban Trac. Co., Lim., Ord	— ⅛	⅜ — ⅝
100	London General Omnibus Company, Limited, 4½% Deb.	...	97½ — 99½
100	Do. Do. 5% Cum. Inc. Deb. Stk. Red.	...	89 — 92
100	London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red	— 1	59 — 63
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref.....	...	4½ — 5¾
5	Do. do. 5% Deb. Stk., Red.	...	101 —103
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	79 — 82
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	...	107 —110
$1,000	Do. do. 5% Bds.	...	99¾ —100½
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	⅛ — 1/16
100	Metropolitan Elec. Trms. Ltd., 4½% Deb. Stock, Red. ..	...	89 — 92
100	Do. 5% Deb. Stock, Red. ..	...	85¾ — 88½
100	Mexico Tramways Co., Common Stock	— 3	71 — 74
500	Do. Gen. Con. 1st Mort. Gld. Bonds	...	79 — 83
100	Do. 6% 50-yr. Mort. Bonds	...	78 — 83
...	Michigan United Railways 5% 1st Mort. Gld. Bonds ...	...	91½ — 93½
100	Montreal Street Railway, Sterling 4½% Debs. (1922).....	...	98 —100
100	Do. 4½% Sterling Debs, (1922) ...	...	99 —101
1	National Steam Car Co. Ltd.	...	⅛ — ⅜
10	Oldham—Ashton and Hyde Elec. Ord.	...	6 — 6¼
10	Do. do. 5% Cum. Pref.	...	5¾ — 6⅛
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	3¾ — 4¾
5	Do. do. 6% Cum. Pref.	...	4 — 4¼
1	Perth (W.A.) Elec. Trams., Ld., Ord.....	...	—
1	Potteries Electric Traction Co., Ltd., Ord.	...	⅜ — ⅝
1	Do. 5% Cum. Pref.	...	⅛ — ⅜
100	Do. 4½% Debenture Stock, Red.	...	84 — 87
1	Provincial Tramways, Lim., Ord.	...	1/16 — 1/16
10	Do. 5% 1st Deb. Stock	...	95 — 98
...	Puebla Tramway, Light & Power Co., Prior Lien 5% ...	...	77 — 82
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.....	...	5 — 5½
100	Do. do. 4½% 1st Mt. Db. Stk	...	95 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	87 — 89
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	...	97 — 99
100	Do. do. 5% 50-yr. Mort. Gold Bonds	...	89 — 91
100	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	...	93 —101
$500	Do. 5% 1st Mort. Debs., Red., 1929	...	96 — 99
10	Shanghai Elec. Construction Co.	...	13¾ — 18¾
100	Singapore Elec. Tramways Lim., 5% Debs. Red	...	88 — 91
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ...	...	⅝ — ¾
100	Do. do. 4% Deb. Stk.....	...	66 — 70
..	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	95 — 97
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	98 —100
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	83 — 86
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	— 2	90 — 92 xd
5	United Elec. Tramways of Monte Video, Ord.....	...	4½ — 5¼
5	Do. do. 6% Cum. Pref.....	...	4⅞ — 5¾
100	Do. do. 5% 1st Deb. Stk. Red.	+ 1	95 — 98
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	93¼ — 96½
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	⅞ — 1
5	Do. do. 6% Cum. Pref.....	...	4 — 4½
100	Do. do. 4½% 1st Deb. Stock. Red.....	...	83 — 86

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THE

Tramway & Railway World

Vol. XXXV. No. 20. | LONDON, SATURDAY, APRIL 18, 1914. | [Established in 1892.

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

FINSBURY BOROUGH COUNCIL.

WOOD PAVING.

The Finsbury Borough Council invite tenders for Paving with Creosoted Deal on Portland Cement Concrete the Carriageways of Cowcross Street (part) and Turnmill Street.

Specifications can be seen and forms of tender obtained at the Borough Surveyor's Office any day, except Saturday, between 10 a.m., and 4 p.m., on deposit of one guinea, which will be returned on receipt of a *bonâ-fide* tender.

Tenders must be delivered to me not later than 4 p.m. on Monday, 27th inst. Only those made upon the official form and properly filled in will be entertained.

GEORGE WHITEHEAD PRESTON,
Town Clerk.

Finsbury Town Hall, E.C.,
April 14, 1914.

COUNTY BOROUGH OF HASTINGS.

TO TIMBER IMPORTERS AND MERCHANTS.

The Corporation are prepared to receive tenders for the supply and delivery to Hastings Railway Station of 357,000 9-inch or 442,000 7-inch Jarrah Wood Paving Blocks.

Specification and form of tender may be obtained at the Office of the Borough Engineer, Mr. P. H. Palmer, M.I.C.E., Town Hall, Hastings.

Tenders will not be considered unless made on the prescribed form and accompanied by samples of the blocks.

Tenders, under cover, endorsed "Tender for Wood Paving Blocks," to be delivered at the Town Hall, Hastings, not later than 12 noon on the 27th day of April, 1914.

The Corporation do not bind themselves to accept the lowest or any tender.

BEN. F. MEADOWS,
Town Clerk.

Town Hall, Hastings,
April 11, 1914.

MUNICIPAL COUNCIL OF JOHANNESBURG.

CONTRACT NO. 842—TRAMWAY TICKETS.

Sealed tenders, marked "Tender for Tram Tickets," will be received by the Town Clerk, Municipal Offices, Plein Square, Johannesburg, so as to reach him not later than noon, Friday, May 29, for the above. Specification, samples, and tender form may be seen on application to the Council's Agents in London, Messrs. E. W. Carling and Co., St. Dunstan's Buildings, St. Dunstan's Hill, E.C. The lowest or any tender not necessarily accepted.

E. S. L. TAAFFE,
Controller of Stores and Buyer.

Johannesburg, March 15, 1914.

THE GREAT INDIAN PENINSULA RAILWAY COMPANY.

The Directors are prepared to receive tenders for the supply of the following Stores, namely:—

Helical and Volute Springs.	Mild Steel Plates, Sections,
Fencing Materials.	Bars, etc., for Miscellaneous
Screw Jacks, etc.	Purposes.

Specifications and forms of tender may be obtained at this office on payment of the fee for the specification, which payment will not be returned.

Tenders must be delivered in separate envelopes, sealed and addressed to the undersigned, marked "Tender for Helical and Volute Springs," or as the case may be, not later than 11 o'clock a.m. on Thursday, April 23, 1914.

The Directors do not bind themselves to accept the lowest or any tender.

R. H. WALPOLE,
Secretary.

Company's Offices,
48, Copthall Avenue, London, E.C.,
April 15, 1914.

ILFORD URBAN DISTRICT COUNCIL.

ELECTRICITY DEPARTMENT.

The above Council invite tenders for the supply of the following, required in connection with their Goodmayes sub-station:—

Contract A 27—Battery Booster.
Contract A 28—Storage Batteries.

Specifications, conditions, and forms of tender may be had on application to Mr. Arthur H. Shaw, M.I.E.E., M.I.M.E., Electricity Works, Ley Street, Ilford, Essex.

Sealed tenders, endorsed "Tender for ———— Electricity Works," as the case may be, must be delivered to me on or before 12 o'clock noon on Tuesday, April 28, 1914.

The Council does not bind itself to accept the lowest or any tender.

By order, ADAM PARTINGTON,
Clerk of the Council.

Town Hall, Ilford, April 8, 1914.

CITY OF MANCHESTER.

The Electricity Committee of the Manchester Corporation are prepared to receive tenders for the supply, delivery, and erection at their Stuart Street generating station of a 5,000 kw. Turbo-Alternator, complete with Pipework, Pumps, and Condensing Plant.

Specifications, drawings, and forms of tender may be obtained on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester, on payment of a fee of two guineas, which amount will be refunded on receipt of a *bonâ-fide* tender.

Further particulars and information can be obtained on application to Mr. S. L. Pearce, Chief Electrical Engineer, Dickinson Street, Manchester.

Tenders, duly endorsed and addressed to the Chairman of the Electricity Committee, must be delivered at the Town Hall not later than 10 a.m. on Wednesday, May 13 proximo.

The Corporation do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester,
April 14, 1914.

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THE ROHILKUND AND KUMAON RAILWAY COMPANY, LTD.

The Directors are prepared to receive tenders for the supply and delivery of :—

(a) { 3,165 Tons Rails, 50lb. per yard,
12,015 Pairs Fish-plates for ditto,
2,950 Pairs Fish-plates for 41¼lb. per yard,

(b) No. 424,910 Dog Spikes,

as per specifications to be seen at the Company's offices.

Tenders, addressed to the undersigned, and marked "Tender for Rails and Fish-plates," or as the case may be, are to be lodged not later than noon on Tuesday, the 28th day of April, 1914.

For each specification (a) and (b) a fee of 10s. will be charged, which cannot under any circumstances be returned.

The Directors do not bind themselves to accept the lowest or any tender.

By order of the Board,
ALEXANDER IZAT,
Managing Director.

237, Gresham House,
Old Broad Street, London, E.C.,
April 16, 1914.

STOCKPORT CORPORATION.

UNIFORM CLOTHING.

The Tramways Committee of the Stockport Corporation invite tenders for the supply of Uniform Clothing for a period of twelve months.

Forms of contract, specification, and tender may be obtained on application to the undersigned.

A. T. EARDLEY,
Tramways Manager.

Stockport, April 15, 1914.

POSITION WANTED.

ENGINEER.

With practical and commercial experience, desires appointment. Several years' experience in Electric Traction work in all details from construction to running. Thoroughly accustomed to management and control of men. Ten years' general manager. Highest testimonials. Box 77, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.

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THE TRAMWAY & RAILWAY WORLD,
WITH MOTOR TRAFFIC SECTION.
Complete with Title-Page and Index.
VOL. XXXIII., JANUARY—JUNE. 1913
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Amberley House, Norfolk Street, W.C.

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Whenever you are repainting your poles ask for samples of the Kearsley ready-mixed POLE PAINTS as supplied to important Companies at home and abroad. These Paints are durable, retain their colour during exposure, and prevent rust. Information free on request.
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Makers of Simplex Steel Conduit System and
WIRES and CABLES.
BITUMEN CABLES.
TRAMCAR HEATERS.
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MEASURING INSTRUMENTS.
WATERTIGHT FITTINGS FOR CAR SHEDS.
ENCLOSED (Indicating) FUSES (to N.E. Code or English Standard).
500 page Catalogue sent free on request.

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Tramway Engineers,
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
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Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
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SUPPLY
JARRAH
THE SANITARY WOOD PAVING
REGISTERED TRADE MARK. M.J.
Telegrams: "JARRAH, LONDON." Telephone: 368 LONDON WALL.

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for finishes of great durability and brilliant lasting lustre.
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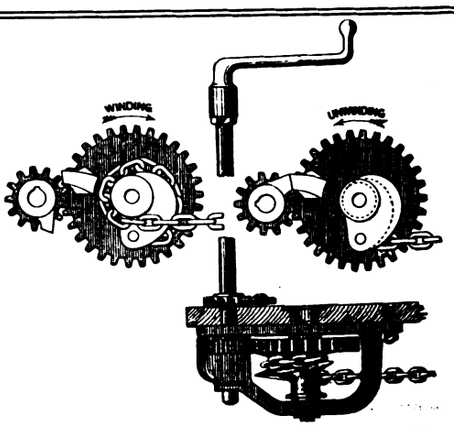

The "Peacock" IMPROVED Brake
(PATENT).
Note the simplicity of the Radial Contact pieces which render this the quickest of all geared hand brakes by
(1) Preventing the drum from over-running on release;
(2) Stopping the drum always at the point from which recovery of chain is most rapid;
(3) Eliminating all idle turning of the handle.
THE "PEACOCK" BRAKE CO., 27, CLEMENTS LANE, LONDON, E.C.

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THE
Tramway AND Railway World

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SATURDAY, APRIL 18, 1914.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

MUNICIPAL TRAMWAY RESULTS.

The analyses of municipal tramway accounts in our issue of April 9 gave the results of operations for the financial year ended in most cases March 31, 1913, but in a few instances closing at later dates, some as late as December 31 last. Taking 80 municipal tramway undertakings and examining the figures for those of the previous year, some interesting comparisons arise. Traffic on the whole shows a substantial growth, as 57 of the undertakings reported increases in gross receipts, while only 23 showed decreases. Of the latter, however, no fewer than seven are in the metropolitan area, where the decreases are, of course, directly attributable to motor omnibus competition. In regard to working expenses, 61 undertakings show increases, while 19 have decreases. In many cases, of course, an advance in working expenses is the direct result of an increase in the mileage run, either on the length of track existing in the previous year, or on it and on extensions which may have been opened. The constant tendency to increase in wages and to shorter hours of labour has also to be reckoned with, and the price of materials, though it may possibly fall in the future, was doubtless at about a maximum during the maximum activity of trade coinciding with the year under review. It is noticeable that the decreases in working expenditure occurred almost entirely among the smaller undertakings, though at the same time some of these smaller businesses showed increases. Coming to the gross profit on working, 43 of the undertakings showed increases and 37 had decreases, this being a much less satisfactory apportionment than those obtaining under the heads of gross receipts and working expenses. Here again metropolitan undertakings, owing to their special conditions, figure out badly, especially in the case of the London County Council. Glasgow shows a decrease, owing, no doubt, to the reductions in fares, but Leeds and Belfast are also among the places which come out slightly less satisfactorily than in the previous year. As a rule the great English towns show well. When we come to the heading of net surplus after meeting deductions from gross profit, we are on less certain ground for comparison. That is because the deductions embrace not only interest, sinking fund and income-tax, but also depreciation and renewals funds and sundries. The last-named is a very uncertain item, and depreciation and renewal allowances are regulated according to the amount of surplus available. That being understood, the number of undertakings showing a net surplus is 58, and of those having a deficiency, 18. The others bring out an even balance. For the previous year the figures were 63 and 13 respectively. Twenty-nine undertakings made contributions to a reserve fund, against 27 in the preceding year, and 36 gave part of their profits to relief of rates, as compared with 37. These figures do not appear to show very much change on the whole, but at all events they demonstrate that the undertakings over all continue to maintain their position despite adverse circumstances as to working expenses. If, however, the aggregate receipts and expenses of all the undertakings be considered, it would be found that the volume of business continues to grow. This volume will probably increase still more rapidly in future, because in addition to tramway extensions the municipalities will soon have considerable installations both of the trackless trolley system and of motor omnibuses.

CORPORATIONS AND CAR BUILDING.

Opinions differ as to the advisability of permitting a union official to occupy a seat on a tramway committee. The balance of argument is against such a concession, for there are occasions when the councillor's duty to the ratepayers generally is likely to conflict with what are supposed to be the interests of the body of employees on whom he is dependent. An illustration of the difficulty was given at Bradford recently when the secretary of the Bradford tramwaymen's union, who is a member of the tramways committee, endeavoured to induce the council, against the recommendation of the manager, to order that fifty new cars required should be built by the tramway department. It is difficult to understand by what process of reasoning a member of a tramway committee could honestly convince himself that both the ratepayers and a body of workmen could be advantaged by giving Bradford the new industry of car-building under municipal auspices. There is no guarantee that works of this type effect any saving. Two or three Corporations who have ventured to take up car-building have never, apparently, claimed economy as the result of their departure. Moreover, only the very largest undertakings can hope to find enough work to keep car-builders engaged permanently, and consequently many of the hands have to be discharged at various times. Yet the Bradford councillor airily contemplated that contingency, for he assured the Corporation that this new industry would provide constant work for six, eight or twelve months to a score or more of local workmen. No suggestion was made by him as to the manner in which the men were to subsist after the completion of the work in hand, nor did he show any consideration for those who would be displaced in private car building works as the result of the latest extension of municipal trading. It was, of course, alleged that bodies made in the Corporation

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works would be superior to a stripped body which had been supplied by a contractor, though nothing was said as to the cost of the respective specimens. A desire was expressed by the same councillor to secure improvements tending to the greater comfort and safety of passengers, and he also stated his conviction that the tramways department were more likely than the private contractor to experiment in introducing improved cars. The records of the Patent Office published in this journal do not indicate that tramway departments are more fruitful than outsiders in evolving ideas that will stand the test of operation, although there are many large tramway undertakings that carry on the work of repairing cars. Thus every facility is at hand for testing supposed improvements. Repairing shops are a necessary and legitimate branch of municipal tramway working, but, as a general rule, any attempt to go beyond this work entails difficulty and expense. Ratepayers would be well-advised to insist that tramcar construction should be left in the hands of those who are experts and who have the necessary experience and facilities for the work.

BOARD OF TRADE REPORTS.

THE OVERTURNING OF A MANCHESTER CAR.

The accident which occurred on Manchester Corporation tramways on February 25 is the subject of a report made to the Board of Trade by Colonel P. G. von Donop, R.E., who held an inquiry into the circumstances. A car ran off the curve at High Street and Upper Brook Street, overturning and causing twenty passengers to sustain injuries. There was a fog at the time, but the driver admitted that he could see 40 yards ahead, and that he was going too fast, his excuse being that he did not know how near he was to the curve. The Corporation's rules are that in foggy weather cars must be driven slowly, and a sharp look-out kept, and that the car must be driven slowly through all facing points and round all curves, and when entering and leaving loops the speed must not exceed four miles an hour. This particular car possessed ample stability for running round the curve at a considerably higher speed than that authorised. The report adds that from the evidence there could be no doubt that the driver allowed the car to run at top speed along High Street, and the responsibility for the accident consequently rested upon him.

A MISHAP AT FACING POINTS IN DUBLIN.

Colonel von Donop has also reported on the derailing and overturning of a Dublin tramcar at the corner of Merrion Square on February 1, when 30 passengers notified the company of personal injuries sustained, and one, a woman, has since died. In his conclusion Colonel von Donop says:—"There seems no reason to doubt that the facing points were, as stated by Motorman Downes, set for the curve instead of lying in their normal position, set for the straight road, and the reason for their having been in this position cannot be definitely ascertained. From the evidence, I think, it is probable that the speed of the car at the facing points was between five and six miles an hour. That speed by itself should hardly have been sufficient to have caused its derailment. It was, however, clearly in excess of that laid down in the company's regulations, and that was, undoubtedly, the reason why Downes was unable to conform to the rule that he should have ascertained that the points were lying the right way before running through them. Downes states that it was immediately after seeing that the points were lying the wrong way that he applied the magnetic brake, but that after doing so he had not time to apply the hand brake, so it is clear that it was immediately after the application of the magnetic brake that the derailment occurred. It seems probable, therefore, that this brake was not applied until the car had passed through the points, and had reached the curve. The sudden check caused by this application of the magnetic brake whilst the car was running at a slightly excessive speed round a sharp curve would, undoubtedly, have a tendency to cause the wheels to jump the rails to the outside of the curve, and this must, I consider, be regarded as the ultimate cause of this derailment. The accident must, therefore, be attributed, firstly, to the fact that the points for some reason which cannot definitely be ascertained were not lying in their normal position; secondly, to the fact that the speed of the car when approaching the points was too great to allow of the driver's ascertaining their position and stopping the car before running through them; and, thirdly, to the sudden application of the brake when running round the curve at a rather high rate of speed. This is the first serious accident which has occurred at electrically-worked facing points. It shows that, with this arrangement, great care is required on the part of the driver to make sure of the position of his controller handle when he is running past the contacts, and also to approach the points at a sufficiently low rate of speed to enable him to stop his car if he finds that the points are lying in the wrong position. The company's attention might, I consider, be called to the necessity for supervision with regard to these matters."

TRAIL CARS FOR LONDON UNITED TRAMWAYS.

THROUGH TRAFFIC FROM THE LONDON COUNTY COUNCIL SYSTEM.

The members of the Select Committee of the House of Commons who considered the London United Tramways Company's Bill were Mr. W. Guinness (chairman), Sir W. R. Essex, Mr. J. C. Lyttelton, and Mr. T. Richardson. In support of Clause 6, which applied for powers to run trail cars, Mr. A. L. C. Fell, chief officer of London County Council tramways, stated that the intention was not to cut down the service of cars, but to provide for the better handling of rush traffic. Separate cars would occupy more space than would be the case with trail cars. The length of a car and trailer was about 61ft., while the length of two separate cars was 70ft. At the Tooting terminus of the County Council's system in the busy hours of the day they were turning 72 cars an hour, and eight of them were fitted with trail cars. They were going to have a good many more trail cars on that route. There were enormous rushes at Hampton Court on the company's tramways at Bank Holiday periods and on Sundays, and he had seen great crowds waiting to get away. The County Council had already power to make an arrangement with the London United for mutual running powers, and such an arrangement at Tooting would greatly simplify the use of trail cars on both systems. The use of trail cars would reduce the cost by about half so far as those cars were concerned. The cars had long been in use, and it was possible to get more up-to-date cars. It would mean more congestion if separate cars were added instead of trail cars. In answer to the chairman, Mr. Fell said he had been over the London United system, and, in his opinion, the roads were quite as suitable for trailers as the streets of London. There were ten dead ends on the London United system, mostly at slack points.

Chief Constable Craik, of the public carriage department, Scotland Yard, said that almost all the routes upon which trail cars could be run on the London United had dead ends, and at Kingston Hill it was on a slope. In reply to the chairman he admitted that it would abolish the inconvenience of dead ends if running powers were arranged between the London County Council and the London United. In the opinion of the police, two cars coupled would increase obstruction more than two separate cars. The London United ran through narrow winding streets in Kingston, Twickenham, and Brentford, and where dead ends occurred there was considerable danger from shunting. The police were not objecting to the placing of 150 more trail cars on the London County Council lines. The Portsmouth Road was one of the main thoroughfares for motor cars from London. Last year Parliament refused a similar application from East Ham which was opposed by the police.

Other police witnesses referred to the unsuitability of a great deal of the route for trail cars, but the chairman said that all the committee had to do was to settle the general principle, and leave the Board of Trade to settle details.

Mr. Stephen Sellon, consulting engineer, said he had not the slightest hesitation in saying that trail cars could be used all over the system with great advantage and perfect safety. He had never seen or heard of any accident due to a trail car. The difficulty in shunting could be easily met by apparatus which enabled the driver to drive from the end of the trail car as well as from the end of the motor car.

Mr. A. H. Pott, general manager of the London United and the Metropolitan Electric Tramways, said his experience convinced him that trail cars were the best method of dealing with the rush traffic.

Mr. J. Devonshire, managing director of the company, submitted diagrams showing the car loading on both ordinary and exceptional occasions. The latter embraced in one case over 80 cars to the hour, which was quite equal to anything in London traffic. The use of trail cars would be of advantage both to London and local traffic, they could be kept at various points, and in the event of the exigencies of traffic requiring it they could be brought out and hitched on to the ordinary cars. In reply to the chairman, witness said he would give an undertaking that the intervals between the cars should not be prolonged. It would be entirely contrary to the best interests of the company to reduce the ordinary service. The old axiom was that if a car was not in sight they were not catering for the public, and with the existing omnibus competition it was quite obvious that they must have a car in sight. Last year, in spite of the extra services of omnibuses, the company had every available car out sometimes, and were unable to cope with the traffic. Replying to the company's counsel, witness said he would pledge himself not to reduce the ordinary service of cars.

Witness added that it would not be possible for the company to increase the provision of ordinary cars, seeing that they now had 250 per cent. in excess of their normal requirements. But the economy of the trail cars would be such that it would be possible to provide them. Tooting was one of the principal routes upon which trail cars were run by the London County Council, and he had been approached by the London authority with a proposal for through running which was recognised as very desirable.

After hearing opposition from Surbiton and Teddington the committee granted the clause, subject to the conditions that the frequency of the present service of cars was not to be decreased; that the right to run trail cars should not affect any existing agreement on the matter between the company and a local authority save with the consent of such authority; and that the Surbiton spur should be excluded from the use of trail cars.

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THE FIGHT FOR LONDON TRAFFIC.

An interesting article by Mr. Arnold Wright on "The Fight for London Traffic" appears in the current issue of the *Financial Review of Reviews*. As Mr. Wright says, London traffic "is a prize well worth striving for; it has potentialities beyond the dreams of avarice." The possibilities are indicated by the fact that the number of journeys per head by railway, tramway, and omnibus increased from 144.9 in 1903 to 243.9 in 1912. No account is taken in these figures of the passengers carried by the ten thousand cabs which ply for hire in the Metropolis. The improved means of public transport is, of course, reducing the use of cabs, and this change is still continuing. The railway position Mr. Wright regards as highly unsatisfactory, in view of the enormous developments in the travelling habit. What the railways are losing, the omnibuses are gaining. In recent British industrial history there is, as Mr. Wright truly says, no more splendid example of what can be accomplished by enterprise, skilled direction, and a bold and imaginative policy than that furnished by the London General Omnibus Company's operations in the past two or three years. When he turns to the tramways, Mr. Wright is afflicted with the prevailing pessimism; but, in common with most other writers, he overlooks the essential fact that it is impossible for the traffic handled by the tramways to be carried by motor omnibuses. In London traffic, as a celebrated statesman once said of another situation, it is a condition which confronts us, not a theory. The people must be carried, and while the tramway may not be an ideal mode of urban transit, it is at present the only practicable method of dealing with the enormous crowds which must be handled. Compared with the railways, Mr. Wright thinks that neither the motor omnibus nor the tramways have a happy outlook. Generally speaking, the railways will, he says, soon have seen the worst of the adverse conditions to which they have been subjected, if they exert themselves adequately, and are not afraid to make new, and even startling innovations in their established policy. The same issue of the *Financial Review of Reviews* contains a timely article by Mr. T. Good, on "The Railway Labour Problem," a topic of which we are certain to hear much more before the autumn.

TRAFFIC RESULTS IN 1914-13.

Bradford.—The traffic receipts for the year were £308,138, as compared with £289,616 for 1912-13, an increase of £18,521. The corresponding figures for the year ended March 31, 1912, were £282,377. The car mileage was 6,255,878, as compared with 5,971,561, an increase of 284,317. Receipts per car mile were 11.82d., an increase of .19d. The number of passengers carried was 67,651,839, an increase of 5,645,863.

Leeds.—A statement showing the revenue resulting from the working of the city tramways for the year ended March 31, together with the traffic statistics, issued by Mr. J. B. Hamilton, general manager, gives the following details:—

	To Mar. 31, 1914.	To Mar. 31, 1913	Increase.	Increase per cent.
Total receipts	£427,461	£411,531	£15,930	3.87
Miles run	9,204,331	8,795,465	408,866	4.6
Passengers carried	93,079,774	89,668,185	4,011,589	4.4
Receipts per mile	11.145d.	11.229d.	—	—
Average fare paid per passenger..	1.081d	1.088d.	—	—
Population served	525,000	525,000	—	—
No. of times population carried ..	178	171	7	4.09
Amt. paid per head of population	16.1	15.3	1cd.	5.5

The total receipts constitute a record, and are £15,930 above those for the preceding year.

Newcastle-on-Tyne.—A record was established by the net receipts and number of passengers. The receipts were £258,000, as against £228,000 last year, while 58,000,000 passengers were carried, an increase of 6,000,000. The working expenses totalled £149,000, an increase of £20,000, due to the opening of two extensions, an increase in the number of the employees, and advances in their wages. There are 185 cars and 68 miles of track, the figures for the previous year being 152 and 62.

PRIVATE BILL LEGISLATION.

London United Tramways.—Under Clause 8 of the London United Tramways Company's Bill, which has passed a Select Committee of the House of Commons, authority is given to carry additional passengers inside the cars during inclement weather, or on special occasions, such extra passengers not to exceed one-third of the number of passengers the car is licensed to carry. Clause 7, which was also passed, gives power to reserve carriages for special purposes, to charge special fares, and to exclude the public from the right to use such cars. In respect of this clause the committee embodied in the Bill clause 43 of the London County Council Tramways Act.

Newcastle Corporation.—Subject to the consent of the County Council being produced to tramway extensions when the Bill came on for hearing, the Standing Orders Committee have allowed this Bill to proceed.

Proposed Extensions at South Shields.—The Tramways Committee having instructed the Tramways Extension Sub-Committee to make preliminary inquiries in regard to the acquiring of powers to extend the service to Sunderland, the committee have decided to recommend the extension of the tramways in two directions.

MISCELLANEOUS NEWS AND NOTES.

Burnley Goods Truck.—Mr. Mozley's goods truck experiment is being discontinued on account of insufficient business being forthcoming.

Site for a New Depot at Sheffield.—The Tramways Committee have acquired a piece of land in the Crofts area from the Corporation for the purpose of erecting a tramway depôt.

Proposal to Lease Barking Tramways.—It is reported that the Barking Urban Council are offering to lease their tramway system to a neighbouring East London authority, failing which the cars will cease running on June 24.

London Traffic Accidents.—During the first quarter of the present year, the Home Secretary stated in the House of Commons on April 6, thirty-two persons were killed by motor omnibuses and ten by electric tramcars in the Metropolitan police district. The total number of street traffic fatalities in the same area during the same period was 114.

Signal Engineers' Association.—The Association of Railway Companies' Signal Superintendents and Signal Engineers will hold their forty-eighth conference at the Railway Clearing House, London, on Thursday, May 7. The President for the ensuing year is Mr. C. Dutton, signal superintendent of the London, Brighton and South Coast Railway, New Cross.

Pontypridd and Car Screens.—The tramways engineer has been asked to report on the question of providing screens to protect the motormen from rain, etc. In order to give relief to motormen who work 14 hours on certain days, the Tramways Committee have decided that conductors should be trained as drivers and that cleaners should be called out to take the places of conductors.

London County Council Highways Committee.—The members of this committee are now as follow:—Mr. G. H. Hume (chairman), Lord Monk Bretton (vice-chairman), Sir John Benn, Messrs. G. A. Dutfield, B. B. Evans, A. O. Goodrich, H. H. Gordon, W. Hunt, Captain A. C. H. Kennard, Messrs. T. Prestige, A. Cooper Rawson, A. H. Scott, W. J. Squires, S. Joyce Thomas, H. Ward, Sir Edward White, and Mr. A. W. Yeo.

The Winnipeg Electric Railway Company, of which Sir William Mackenzie is president, has, it is reported, engaged the J. G. White Engineering Corporation to complete surveys, explorations, designs, plans, and estimates for a large hydro-electric development near Winnipeg, Canada, which ultimately will be considerably in excess of 100,000 horse-power and which initially will be for 40,000 horse-power. Work on the surveys and designs is to be started immediately and completed as rapidly as possible.

Fifty Car Bodies Required for Bradford.—The City Council have adopted a recommendation for inviting tenders for the supply of 50 car bodies. Replying to a suggestion that the bodies should be made by the department, Mr. Priestley, the chairman of the Tramways Committee, said the routes had been extended and there had been complaints of overcrowding. The manager was asked whether in addition to doing the ordinary repairs the workshops would be able to put the necessary new cars on the road in a reasonable period. His reply was "Certainly not."

Railway Development in East Africa.—In the House of Commons on Wednesday the Committee stage was concluded of a Bill promoted by the Government for the purpose of authorising a loan of £3,000,000 to the Protectorates of East Africa, Nyassaland, and Uganda. The money is to be used for the improvement of the Uganda Railway, and for the construction of new railways, roads and piers for steamers. The Uganda Railway is to be relaid with heavier rails, and out of the total loan about £1,000,000 is to be spent on new rails and rolling stock for that railway.

The Metropolitan Electric Tramways Athletic and Social Club give their sixth annual grand concert in aid of the M.E.T. Employees' Benevolent Fund on Thursday, April 30, in the Central Hall of the Alexandra Palace. Among the artistes who will appear are Miss Ruth Vincent, Miss Carmen Hill, Mr. Alfred Heather, and Mr. Thorpe Bates. Mr. G. D. Cunningham will give recitals on the great organ, and the full military band of the Metropolitan Electric Tramways will take part. Tickets may be obtained from Mr. Ernest J. Hammond, honorary band secretary, Manor House offices, Seven Sisters Road, Finsbury Park, N.

The Grand Trunk Pacific Railway track was completed at 12.45 p.m. on April 7, when the mountain section was connected at Nechaco River crossing, 375 miles east of Prince Rupert, and 1,371 miles west of Winnipeg. During the past twelve months 500 miles of line have been graded, and the track laid through the mountains of British Columbia. It was only possible to work from the two ends, and the line included eleven difficult river bridges. This work far exceeds any previous record in railway construction on the American continent. Although the track is now completed, it will be some months before regular service will be commenced.

Potteries Tramways Company's Omnibuses and Plying for Hire.—At the instance of Stoke-on-Trent Council the Potteries Electric Traction Company were summoned on April 3 for plying for hire with four unlicensed motor omnibuses. It appeared that only persons who obtained tickets at offices provided along the route were carried, and Mr. Scholefield, barrister, contended that this was not plying for hire. The stipendiary magistrate imposed a fine of £2 and costs in one case and £1 and costs in three other cases. In quoting previous decisions elsewhere in support of his ruling, he said that in one instance a company had given notice that passengers could travel free of charge, but voluntary contributions would be welcome.

Electric Tramways in St. Petersburg.—Thanks to last year's open season, work on the new electric tramways system in St. Petersburg has been carried on to a point much in excess of estimates. The

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Volinkino power station buildings and much of the plant have already been completed, while the track work is well in hand—ballast, sand and paving setts delivered en route during the winter so that the road work should be finished before the dates fixed, September 15 (old style) for the Peterhof lines, and October 15 for the entire length to Oranienbaum. As for the cars, which apparently are to be ordered from foreign builders, they are expected to be ready for use by the end of the autumn, though to secure delivery in so short a period the contract would doubtless have to be divided up amongst a number of car-building factories.

Traffic Control at Sheffield.—In his annual report the Chief Constable alleges that confusion arises from the division of the control of the streets among several committees, and he suggests that a Traffic Control Board should be formed, to consist of the chairman and two members of the Watch, Tramways, Highways, Markets and Improvement Committees. The report makes the following references to the tramways:—In many parts of the city the lines are laid too near the side of the road or along narrow streets or so as to dominate nearly all the available space; queues of intending passengers are allowed to obstruct the road; passengers at some of the city termini are compelled to descend into the middle of the road traffic at considerable danger to themselves; in some cases cars stop abreast instead of in echelon, with several cars on each line, one behind the other, and stop too near a street corner so as to obstruct the traffic.

CONTRACTS AND ORDERS.

Stewarts and Lloyds, of Glasgow, have obtained a contract to supply steel standards to the Prahan and Malvern Tramway Trust, at £6,680.

Keighley Council have placed a repeat order for two machine stokers and self-cleaning furnaces at the electricity works with E. Bennie and Co.

Sunderland Council have accepted the tenders of the British Insulated and Helsby Cables, Limited, and the Union Cable Company, Limited, for a supply of cable.

Blackburn Council have placed with Walter Scott, Ltd., a contract for the supply of tramway rails, and with the Electric Construction Company, Limited, for a three-wire booster.

South Shields Council have awarded contracts as follow:—Steel chimney, J. Thompson, Dudley; induced draught plant, Musgrave and Co., Limited; feed pumps, G. and J. Weir, Limited.

Siemens Bros.' Dynamo Works have secured a contract for the supply of Tantalum lamps for one year to Bolton Council, and for traction lamps to Bristol Tramways and Carriage Company and to Newport Council tramways.

Gravesend Council have allotted contracts as subjoined:—British Thomson-Houston Company, Limited, generating plant, £3,772; Mirrlees, Watson Company, Limited, condensing plant, £835; Bruce Peebles and Co., Limited, converting machinery, £2,850.

Bruce Peebles and Co., Limited, have received contracts to supply a spare armature to West Bromwich electricity works, at £1,000; two 350 kw. motor-converters to Armstrong, Whitworth and Co., Montreal; and one 250 kw. motor-converter to the Canada Cement Company, Montreal.

The Edison and Swan United Electric Light Co., Ltd., have secured part of the contract for the supply for twelve months of Royal Ediswan lamps to the British Admiralty. Royal Ediswan lamps are, it may be mentioned, being installed throughout the new Cunard liner s.s. "Acquitania."

Ilford Council have placed the following contracts for annual supplies to the tramways department:—Trolley wheels, Anti-Attrition Metal Company, Limited; tyres, Brown, Bayley's Steel Works, Limited; gear wheels, trolley heads, etc., Alfred Wiseman, Limited; varnish, Robert Kearsley and Co., Limited; elastic journal packing, Hall and Co.; tapes, British Thomson-Houston Company, Limited, General Electric Company, Limited, and R. W. Blackwell and Co., Limited; armature coils, P. R. Jackson and Co., Limited; pinions, British Hele-Shaw Patent Clutch Company.

Manchester Tramways Committee have accepted the following contracts for supplies during the ensuing year:—

Motor and controller spare parts, etc., British Thomson Houston Co., Ltd.; motor and controller spare parts, etc., controllers (complete), Dick, Kerr and Co., Ltd; motor and controller spare parts, traction lightning arresters, 32 car sets magnetic brake equipment, etc., British Westinghouse Co., Ltd.; resistances (grid type), Electro-Mechanical Brake Co, Ltd.; grids for resistances, Henry Wallwork and Co., Ltd.; controller fingers, etc., canopy trolley bases, Estler Brothers; trolley poles, Brecknell, Munro and Rogers, Ltd.; incandescent lamps, switches, bells, telephones, etc., General Electric Co., Ltd.; incandescent lamps (traction), Drake and Gorham, Ltd.; cells, rubber strip, mackintoshes for drivers, etc., C. Macintosh and Co., Ltd.; impregnating insulation varnish, Pinchin, Johnson and Co., Ltd.; insulating compound, R. W. Blackwell and Co.; overhead equipment insulating material, pole switches, A. Wiseman, Ltd.; trolley heads, Equipment and Engineering Co.; trolley wheel bushes and spindles, Fleming, Birkby and Goodall, Ltd.; electrical signal spare parts, Tramway Supplies, Ltd.; automatic sanding devices, M. Cummins; tubular sanding devices, J. Taylor; Peacock brakes, Peacock Brake Co.; automatic lifeguards, Hudson and Bowring, Ltd.; folding sideguards, Philipson and Co.; steel wire, F. Smith and Co., Ltd.; special blocks and wheels for grinding steel rails, emery wheels, Carborundum Co., Ltd.; ball races for trolley standards, W. J. Ritchie and Co., Ltd.; truck and other springs, West Bromwich Spring Co., Ltd.; anti-friction white metal, Tandem Smelting Co., Ltd.; car axles and car wheel tyres, Cammell, Laird and Co., Ltd.; car wheel centres, Edgar Allen and Co., Ltd.; gear and pinion wheels, F. W. Rowlands and Co., Ltd.; chilled iron brake block castings, National Rail and Tramway Appliances Co., Ltd., and Interchangeable Brake Block Co., Ltd.; tramcar meters, Chamberlain and Hookham, Ltd.; Thermit welding, etc., Thermit, Ltd., London.

Other contracts accepted are for tramway rail bonds, British Insulated and Helsby Cables, Limited; trolley wire, F. Smith and Co., Limited; and brackets and tubes for tramway poles, J. Spencer, Limited.

LONDON COUNTY COUNCIL CONTRACTS.

London County Council, at their meeting last Tuesday week, confirmed recommendations for a large number of contracts, most of them for annual supplies. Other tenders accepted, however, were as follow:—Thermit, Limited, 1,500 welding portions for rail joints at 19s. 6d. each, 7½ additional portions to be supplied free of cost for every 100 ordered; John Mowlem and Company, road-work and plate-laying for the construction of the remainder of various tramways in High Street, Wandsworth, and from London Road to Forest Hill, and paving works in connection with the widening of High Street, Wandsworth.

The following were tenders accepted for the supply of tramway parts, equipment, etc., for the twelve months ending April 30, 1915:—

Electrical equipment (motor and generator) spares—The British Westinghouse Co.; Dick, Kerr and Co.; Dyer and Young, £145 10s.; Alfred Clare and Co., Westminster, £134; the Manchester Armature Repair Co., £215 12s. 6d.

Electrical Equipment (controller, circuit breaker and other switch, etc., details, and magnetic brake) spares—British Westinghouse Co.; Dick, Kerr and Co., £30 6s.

Contact fingers and parts, segments, etc.—Edwin Showell and Sons, Birmingham, £771 4s.; Tramway Supplies, Ltd., Leeds, £313 12s. 7d.; Dyer and Young, £168 7s.; British Westinghouse Co., £5 18s. 6d.

Pressed brass and steel articles—Mole and Son, Birmingham, £470 5s.; Hadfield's, Limited, Sheffield, £73 8s. 9d.; the Conveyor and Elevator Company, Accrington, £89 2s.; J. Sankey and Sons, Bilston, Staffordshire, £50 18s. 9d.; W. M. Still and Sons, Hatton Garden, E.C., £125 6s. 10d.; Peter Hooker, Walthamstow, N.E., £72 10s.

Electric cable, fuse wire and cotton-covered copper wire—London Electric Wire Co. and Smith's, Ltd., Golden Lane, E.C., £1,474 13s. 4d.; Liverpool Electric Cable Co., £418.; Callender's Cable and Construction Co., £550 15s.; Hooper's Telegraph and India Rubber Works, Ltd., Lombard Street, £396; Saxonia Electrical Wire Co., Greenwich, £106 17s. 6d.; British Insulated and Helsby Cables, £1,048 16s. 8d.

Coachpainters' transfers—Corner and Co., St. Paul's Churchyard, £20 10s.; Dangerfield Printing Co., £19; Tearne and Sons, Birmingham, £7 6s. 6d.

Rubber details—India Rubber, Gutta Percha and Telegraph Works Co., £24 7s. 6d.; J. G. Ingram and Son, Hackney Wick, £1,221 15s. 2d.; Irwell and Eastern Rubber Co., Manchester, 18s.; North British Rubber Co., East Road, City Road, N., £76 19s. 3d.

Moulded insulators (other than rubber)—British Westinghouse Co., £113 6s.; Ebonestos Manufacturing Co.; Turners and Manville, Lloyd's Avenue, E.C., £12 12s.; Litholite, Ltd., Hackney Grove, £92 4s.; Crystalate Manufacturing Co., Tonbridge, £2 14s.

Fibre articles—J. Burns, Ltd., Central Street, E.C., £8 6s. 9d.; Cort and Co., Camberwell Road, £12 18s. 6d.; F. A. Hill and Co., Bishopsgate, E.C., £21 16s. 6d.

Mica and micanite articles—G. Schultz and Co., £4 6s.; Micanite and Insulators Co., £17 18s. 6d.

Car furniture—J. M. Siddell, Leeds, £80 10s. 6d.; Howarth and Housen, Birmingham, £31 10s. 2d.; Edwin Showell and Sons, £71 19s. 9d.; Brush Electrical Engineering Co., £24 12s.; Gabriel and Co., Birmingham, £11 5s.

Machined bronze bearings—Anti-Attrition Metal Co., £3,791 5s. (allowance for worn-out bearings, 10d. a lb.).

Machine finished articles (brass, gunmetal, etc.).—Davis and Timmins, King's Cross, £6 4s. 6d.; Anti-Attrition Metal Co., £142 0s. 6d.; Player and Mitchell, Birmingham, £146 3s. 6d.; Edwin Showell and Sons, £57 18s. 4d.; J. Stone and Co., Deptford, £38 5s.; Brecknell, Munro and Rogers, £293 6s. 6d.

Machine finished articles (iron, steel, etc.).—Bayliss, Jones and Bayliss, £370 9s. 9d.; British Westinghouse Co., £75 12s.; E. H. Bentall and Co., Maldon, £29 4s.; Bevan Lock Nut Co. Bexley Heath, £132 10s.; F. W. Cotterill, Darlaston, 16 4s.; Davis and Timmins, £89 19s.; John Holroyd and Co., Milnrow, £52 6s.; Ibbotson Bros. and Co., £23 15s. 6d.; F. W. Rowlands and Co., Seacombe, £19 7s.; Wilkes, Ltd., Darlaston, £236 4s.

Gear and pinion wheels, ratchets, worms, etc.—British Hele-Shaw Patent Clutch Co., Oldham, £200 15s.; F. W. Rowlands and Co., Seacombe, £949; John Holroyd and Co., £32 8s.; Player and Mitchell, Birmingham, £21 12s.

Iron and steel drop forged stampings—Charles Bunn, Ltd., West Bromwich, £305 7s.; Vaughan Bros., Willenhall £76 18s.; Criterion Stampings, Ltd., Willenhall, £80; Deritend Stamping Co., Birmingham, £123; Armstrong, Stevens and Son, £232 12s. 8d.; Woodall and Co., Hull, £16 10s.

Iron and steel forgings—Male and Jordan, Wolverhampton, £44 14s.; Brush Electrical Engineering Co., £36 12s.; Hurst, Nelson and Co., £22 1s. 9d.; Woodall and Co., Hull, £76 14s. 6d.; Bayliss, Jones and Bayliss, £173 17s.; Charles Bunn, Ltd., West Bromwich, £259 4s.; East Ferry Road Engineering Works Co., Millwall, £28 4s.; Warren and Sons, Camberwell, S.E., £14 8s.

Springs—Lion Spring Co., Oldbury, £5 17s.; West Bromwich Spring Co., £405 19s. 6d.; Joseph Steel and Sons, Bingley, £11 2s.; Geo. Salter and Co., West Bromwich, £28 4s. 8d.; Tempered Spring Co., Sheffield, £30.

Machined iron castings—John Holroyd and Co., Milnrow, £112 10s.; H. Newton Knights and Co., St. Dunstan's Hill, £247 10s.; John Crowley and Co., £70 2s. 1d.; T. Summerson and Sons, £382 10s.; the Carron Co., Carron, £622 10s.

Iron castings—T. Summerson and Sons, Darlington, price cannot be stated; Steel Nut and Joseph Hampton, Ltd., Wednesbury; Rodney Foundry Co., price cannot be stated.

Machined malleable iron castings—Bullers, Ltd., £668 14s. 11d.; Leys Malleable Castings Co., £270; John Crowley and Co., Sheffield, £6 18s.; Brecknell, Munro and Rogers, £36.

Malleable iron castings—John Crowley and Co., price cannot be stated; Shotton Bros. Smethwick.

Steel castings—Edgar Allen and Co. £371 5s. 9d.; S. Peace and Sons, Sheffield; M. and G. Truck and Engineering Co., £122 17s.; Hurst, Nelson and Co., £18; F. W. Rowlands and Co., Seacombe, £162 15s.; Hadfield's, Limited, Sheffield, £601 14s.; H. R. Marsden, Ltd., Leeds, £35 10s. 1d.; T. Firth and Sons, Sheffield, £22 1s.

Foundry crucibles, etc.—Morgan Crucible Co., £286 7s. 10d.

Building New Cars out of Revenue.—At the April meeting of Newcastle-on-Tyne Corporation, Alderman Rogers, chairman of the Tramways Committee, proposed the adoption of a recommendation of the committee that sanction be given for the borrowing of £12,240 to defray the cost of acquiring fifteen additional cars, with covered fronts and tops. He said that in the last seven years they had rebuilt 51 cars out of revenue and reserve, and they had built 15 new cars. But they could not go on building out of revenue, and now that 15 more cars were required he asked the Council for consent to borrow the money, so that they could be purchased at once, and so relieve the traffic. An amendment was moved for referring back the recommendation with a view to the money being taken from the reserve fund, and to be replaced next year instead of being voted to the relief of the rates. In reply Alderman Rogers said that it was folly to think that the present-day ratepayers should be levied in order to give the ratepayers of 15 and 20 years hence a free tramways service. That was what they would be doing if they built new stock out of revenue. The Committee's recommendation was adopted.

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PERSONAL.

Mr. Manley has been appointed assistant manager of the South Metropolitan Tramways and Electric Lighting Company.

Mr. T. B. Goodyer, general manager of the Croydon Corporation tramways, has been voted an increase in salary to £550.

Mr. E. E. Moseley has been appointed manager of Todmorden Council's motor omnibus undertaking at a salary of £160. There were 39 applicants.

Mr. E. Morton, charge engineer at Whitehaven Council's electricity works, has been presented with a suit case and a slide rule on leaving to take up an appointment with the Mersey Railway Company at Birkenhead.

Mr. C. B. Smith, electrical engineer, Hove Electric Lighting Company, has been retained by Hove Corporation as electrical engineer on the acquisition of the undertaking by the municipality. The Corporation will shortly install a railless trolley car service.

Mr. F. Heppenstall has resigned the position of manager of the switchgear and transformer department of Messrs. Johnson and Phillips to take up an appointment with the General Electric Company, Limited, 67, Queen Victoria Street, E.C., where he will devote his attention to wires and cables.

Mr. A. Carlyle, a conductor on a London County Council tramcar, was thanked by Sir John Dickinson at Bow Street Police Court for his brave conduct in going to the rescue of a woman who had jumped into the Thames at Westminster Bridge on April 12. Carlyle left his car, and, although only able to swim about a hundred yards, he seized a lifebelt affixed to the Embankment, and swam to the woman.

Motorman Scott, of the Mexborough and Swinton Tramways Company, has been appointed depôt inspector. He has also served on the Dewsbury, Halifax, and Scarborough tramways, and he has service in the Army to his credit, including the Tirah expedition and the South African war. For the latter campaign he received the Queen's and King's medals. In 1907 he was awarded the Royal Humane Society's certificate for rescuing a woman from drowning at Rotherham.

FINANCIAL REPORTS AND MEETINGS.

British Columbia Electric Railway.—An interim dividend at the rate of 8 per cent. per annum on deferred ordinary stock has been declared for the half-year ended December 31.

Oldham, Ashton, and Hyde Tramways.—The report for 1913 shows a revenue amounting to £35,495, and expenditure (including £1,000 for debenture interest and £4,500 placed to provision for renewals account) to £28,816, leaving a net profit of £6,679, while £218 was brought forward. A final dividend at the rate of 7 per cent. per annum is proposed on the ordinary shares, making 6 per cent. for the year, and carrying forward £147.

Babcock and Wilcox, Limited.—The net profits for the past year were £446,073, and £64,013 was brought forward. A final dividend of 9 per cent. is proposed on ordinary shares, adding £150,000 to the reserve, £10,000 to the pension fund, and carrying forward £73,834. The report states that the trade continues to progress, and the directors are continuing to enlarge the scope of the business, in view of the fact that, under the present conditions of manufacturing, a larger output is required to keep up the profits.

The British Electrical Federation.—The traffic statement for the week ended April 10, 1914, shows that the receipts from tramways and railways amounted to £41,667, as compared with £36,839 in the corresponding week last year, and from omnibuses £14,308, as compared with £4,233, making a total of £55,975, as compared with £41,072. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year the receipts show an increase of £5,320 upon the week.

Cork Electric Tramways.—The directors' report for the year 1913, to be presented at the meeting on Friday, April 24, shows that the receipts amounted to £60,135, and the expenses to £37,523. Including the balance from 1912, and deducting interest on debentures there is a balance of £19,272. Half-yearly dividends at 5 per cent. were paid on the preference shares. £6,500 added to reserve, and £1,807 written off. The directors recommend out of the balance the payment of a dividend at the rate of 3 per cent. on the ordinary shares, leaving £1,352 to be carried forward. The expenses show an increase of £1,928, this being mainly due to the enhanced price of coal, heavy maintenance charges for permanent way, third-party accident claims, and the National Insurance Act. The company now have 9.89 miles of track open, and 35 cars.

London Rating Appeal.—In the Court of Appeal on April 8 judgment was given in an appeal by Islington Assessment Committee against a judgment of Justices Bray and Lush, who had granted the London County Council a rule nisi calling upon the Committee to appoint a valuer to make a provisional valuation list, showing the reduction in the rateable value of the tramways in Islington owing to the competition of motor omnibuses. In 1912 and 1913 the gross receipts from tramways had fallen from 11.42d. per car mile to 9.05d. The Borough Council declined to accede to a requisition to appoint a valuer on the ground that there was no *prima facie* evidence of such a reduction as was contemplated by Section 47. The Divisional Court held that Section 47 referred to an increase or reduction during the year in which the requisition was made, and did not mean an increase in, or reduction from, the amount appearing in the quinquennial valuation list. By a majority the Court of Appeal held that the condition precedent to making an order for the appointment of a valuer was that there should be shown either an increase or decrease in fact of the rateable value of the assessment, and that it was not sufficient to come and say the receipts from competition had become less, and therefore there was a *prima facie* cause shown for a revaluing for the purposes of assessment to rates. In that view the decision of the Divisional Court was wrong, and the appeal should be allowed, and the rule discharged. An application for a stay pending an appeal was refused.

WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended April 11, which included Good Friday, give total receipts of £239,534, or £25,029 more than in the corresponding week last year. The total length of track was 2,863 miles, or 24 more than for the corresponding week. Receipts were at the rate of £83 13s. 9d. per track mile, an increase of £8 2s. 8d. as compared with the corresponding week of last year. Owing to the fine weather on Good Friday and the following day many undertakings reported record earnings for the week.

COPPER AND ALUMINIUM MARKET.

April 17, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

	Friday, April 17.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	65 0 0 ..	65 13 9 ..	67 0 0
,, ,, (three months)	65 2 6 ..	64 8 9 ..	69 2 6
Electrolytic Copper—bars or ingots	67 0 0 ..	67 10 0 ..	72 7 6
Aluminium—bars or ingots	83 0 0 ..	83 0 0 ..	89 0 0

COAL MARKET.

April 17, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

	Friday, April 17.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—			s. d.	s. d.
Best Admiralty Welsh (large)	Owing to the miners' strike there are no quotations.	Owing to the miners' strike there were no quotations.	25 6	28 0
Best Seconds			25 0	27 0
Ordinary Drys			23 3	26 6
Best Washed Nuts			22 0	..
Best Washed Peas			20 6	..
Cardiff, f.o.b.—				
Best Admiralty (large) ..			21 0	23 0
Best Seconds			20 6	22 0
Ordinary Drys			18 9	21 0
Best Washed Nuts			17 6	..
Best Washed Peas			16 0	..
Newcastle, f.o.b.—				
Best Steams			16 0	17 0
Best Seconds			14 9	16 0
Smalls			12 6	11 0

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregates. Wks.	Aggregates. 1913-4.	Increase or Dec.
Anglo-Argentine	April 8	£59,251	£60,262	14	£801,300	+ £21,618
Auckland..... (28 days)	Mar. 15	19,566	28,332	37	182,422	+ 8,327
Ballarat and Bendigo	Feb.	4 083	3,893	46	43,543	— 948
Brazilian St. Rly. Mirs.	Feb.	46,044	49,305	30	368,458	+ 57,293
Brazilian Traction.....	April 4	94,214	93,996	14	1,331,828	+ 75,071
Brisbane	March	26,370	28,325	13	81,915	+ 7,875
British Columbia ..... $	Feb.	688,333	704,003	35	6,034,831	+ 352,403
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacrose...	March	46,227	45,222	39	402,125	+ 7,115
Calcutta.....Rs.	April 11	64,068	66,024	14	10,19,460	+ 49,232
Cape Town	Feb.	...	13,842	...	...	...
Carthagena & Herrerias	March	3,695	2,425	13	8,120	— 1,952
Cordoba.....	Feb.	11,795	12,676	47	145,718	+ 12,767
East India	March	1,760	1,884	35	15,402	+ 840
Kalgoorlie.....	March	2,662	2,476	13	6,985	— 1,255
La Plata.....	March	5,771	5,178	13	15,240	— 1,048
Lima.....	Feb.	32,206	33,890	9	71,758	+ 5,423
Lisbon ..... Mirs.	Jan.	...	156,175	4	156,175	...
Madras (14 days) Rs.	April 15	26,766	34,504	15	202,730	+ 17,559
Melbourne	Feb.	62,500	64,000	9	132,500	+ 3,000
Mexico ..... $	Feb.	329,361	553,804	9	1,133,165	+ 242,169
Montevideo.....	March	33,140	32,630	21	170,531	+ 856
Para	April 12	3,935	3,865	19	65,990	— 12,799
Port Elizabeth.....	Feb.	...	3,510	...	...	...
Shanghai .....$	April 1	19,882	24,000	13	308,800	+ 51,282
Singapore .....$	April 11	11,804	12,195	14	180,714	+ 9,484
Toronto .....$	Feb.	718,313	777,683	9	1,625,628	+ 130,387
Winnipeg..... .....$	F. b.	320,131	350,977	9	733,648	+ 61,720

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Name.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Wks	Aggregate. 1913-4.	Increase or Dec.
Aberdeen Corporation..	April 8	£1,454	£1,517	+ £63	45	£71,494	+ £3,971
Accrington Corp.....	,, 8	653	649	— 4	1	649	— 4
Ayr Corporation	,, 11	240	278	+ 38	47	16,789	+ 2,346
Bath Electric	,, 8	750	840	+ 90	14	10,107	— 43
Birkenhead Corp.	,, 12	1,162	1,261	+ 99	1½	2,170	+ 24
Birmingham Corp.	,, 11	11,109	12,372	+ 1,263	1½	20,129	+ 459
Blackburn Corporation	,, 8	1,172	1,219	+ 47	2	2,388	+ 42
Blackpool Corporation	,, 9	554	743	+ 189	1½	987	+ 225
Bolton Corporation	,, 12	2,662	2,536	+ 874	2	5,472	+ 637
Bournemouth Corp.....	,, 15	1,759	3 058	+ 1,299	2	5,130	+ 1,314
Bradford Corporation..	,, 11	5 584	6,231	+ 697	2	10,021	+ 857
Brighton Corporation..	,, 12	819	1,194	+ 375	1½	1,846	+ 304
Bristol	,, 10	7,017	8,270	+ 1.253	14½	106,783	+ 6,024
British Elec. Federatn.	,, 10	41,072	55,975	*	...	...	...
Burnley Corporation ..	,, 11	1,635	2,071	+ 436	2	3,696	+ 475
Burton-on-Trent Corp.	,, 5	264	284	+ 20	1	284	+ 20
Bury Corporation.....	,, 12	1,270	1,735	+ 465	1½	2,715	+ 350
Cardiff Corporation.....	Mar. 21	2,450	2,653	+ 203	51	137,876	+ 12,453
Chatham and District..	April 9	788	957	+ 169	14	11,634	— 197
Chesterfield Corp.	Mar. 31	442	434	— 8	52	13,528	+ 1,379
Colne Corporation	April 4	238	249	+ 11	...	...	...
Cork Electric.....	,, 9	496	491	— 5	14	6 381	— 7
Croydon Corporation ...	,, 3	836	704	— 132	½	704	— 132
Darlington Corporation	,, 4	219	257	+ 38	1	257	+ 38
Derby Corporation	Mar. 28	1,097	928	— 169	52	50,659	+ 4,101
Dover Corporation	April 4	...	137	..	½	137	...
Dublin & Lucan	,, 9	134	127	— 7	14	1,641	— 119
Dublin United	,, 10	5 595	5,371	— 223	15	75,371	— 3,106
Dundee City	,, 8	1,289	1,263	— 26	47	61,027	+ 3,859
East Ham Corporation	,, 11	1,099	1,077	— 22	1½	1,681	— 3
Exeter Corporation	,, 10	301	330	+ 29	1½	484	+ 6
Gearless Motor 'Buses.	,, 11	...	470	...	15	6.600	...
Glasgow Corporation ...	,, 11	20,155	21,191	+ 1,036	15	922,702	+ 63,871
Glossop(U.Elec.Supply)	,, 11	123	135	+ 12	15	1 800	— 27
Halifax Corporation ...	,, 7	1,802	1,984	+ 182	1	1,984	— 57
Hastings & District.....	,, 8	837	799	— 38	14	10,072	— 837
Huddersfield Corp.	,, 11	1,905	2,243	+ 338	2	3,681	+ 195
Hull Corporation	,, 11	3,031	3,309	+ 278	2	5,291	— 69
Ilford U.D.C.	,, 11	433	529	+ 96	1	831	+ 170
Ilkeston Corporation ...	,, 15	121	166	+ 45	3	416	+ 71
Ipswich Corporation ...	,, 11	372	468	+ 96	2	719	+ 128
Isle of Thanet	,, 11	330	577	+ 247	28	9,596	+ 681
Kilmarnock Corp.	,, 11	161	174	+ 13	47½	8.211	+ 497
Lanarkshire	,, 9	1,654	1,852	+ 198	14	25,826	+ 3,214
Lancashire United	,, 8	1,360	1,515	+ 155	14	21,480	+ 2,181
Leeds City	,, 11	7,511	8,386	+ 875	2	13,614	+ 1,911
Leicester Corporation...	,, 11	2,595	3.094	+ 499	15	40,646	+ 2,091
Leith Corporation	,, 11	652	696	+ 44	47½	33,207	+ 1,571
Leyton U.D.C.	Mar. 26	1,466	1,252	— 214	51½	68,140	— 155
Liverpool Corporation..	April 11	12,263	13,054	+ 791	14½	184,774	+ 9,676
Llandudno &Colwyn B.	,, 10	194	239	+ 45	19	3,010	— 284
London County Council	,, 8	41,543	43,567	+ 2,024	1	49,794	+ 2,261
London Gnl. Omnibus..	,, 11	55,109	60,629	+ 5,520	15	832,319	+ 12.884
London United	,, 10	5,477	6,244	+ 767	15	78,608	+ 673
Lowestoft Corporation	,, 11	132	216	+ 94	27	4,872	+ 476
Maidstone Corporation	Mar. 19	159	159	Nil	51	9,938	+ 647
Manchester Corp.....	April 11	16,627	17,895	+ 1,268	2	29,032	+ 2,971
Met. Elec. Trys.	,, 10	8.571	9,985	+ 1,414	15	123,084	+ 1,009
Nelson Corporation.....	Mar. 30	245	260	+ 15	52	10.802	+ 562
N'castle-on-Tyne Corp.	April 11	4,475	5,399	+ 924	2	8,618	+ 731
Newport (Mon.) Corp...	,, 11	717	812	+ 95	1½	1,384	+ 40
New St. Helens & Dist..	,, 8	708	754	+ 46	41	32,955	+ 2,671
Northampton Corp	,, 10	508	544	+ 36	1½	782	— 6
Nottingham Corp.	,, 9	3,199	3,462	+ 263	1½	4.423	— 62
Oldham Corporation ..	,, 12	2,047	2.411	+ 364	3	6,161	+ 369
Portsmouth Corp.....	,, 11	1,833	2,393	+ 560	...	...	...
Preston Corporation ..	,, 8	790	805	+ 15	2	1,656	+ 66
Provincial	,, 11	1,689	2,090	+ 451	28	47,291	+ 2,095
Reading Corporation ..	,, 9	619	698	+ 79	1½	893	+ 110
Rochdale Corporation	,, 11	1,460	1,981	+ 521	2	2,967	+ 440
Rotherham Corp.....	,, 15	886	1,184	+ 298	2	2,160	+ 301
Salford Corporation ..	,, 13	4,879	5,824	+ 945	2	10.001	+ 990
Sheffield Corporation...	,, 12	7,007	7,665	+ 658	2½	19,695	+ 1,370
Southampton Corp.....	,, 8	1,124	1,244	+ 120	1	1,481	— 45
Southend-on-Sea Corp.	,, 8	614	789	+ 175	2	902	+ 114
South Met. Trys.	,, 10	713	1,171	+ 458	15	14,328	+ 3,863
South Shields Corp.....	,, 11	611	841	+ 230	1½	1,271	+ 338
Sunderland Corp.....	,, 12	1.274	1,496	+ 222	2	2,515	+ 168
Sunderland District ...	,, 8	492	542	+ 50	23	12.979	+ 1,107
Swindon Corporation ...	,, 8	139	174	+ 35	1	193	+ 37
Trys. (M.E.T.) 'Buses	,, 11	2.253	9,053	+ 6,800	15	119.848	...
TynesideTrys.&Tmrds	,, 8	468	509	+ 41	14	6,696	— 120
Wallasey Corporation	,, 11	1,050	1,222	+ 172	1½	1,950	+ 103
Walsall Corporation ...	,, 11	572	648	+ 76	15	8,910	+ 100
Walthamstow U.D.C....	,, 11	642	853	+ 211	2	1,308	+ 318
Warrington Corp	Mar. 26	476	428	— 48	51	22,929	+ 336
West Ham Corporation	April 9	2,587	2 874	+ 287	1	3,636	+ 335
Wigan Corporation	,, 9	1,363	1,796	+ 233	1	1,971	+ 89
Wolverhampton Corp	,, 15	981	1,401	+ 420	3	2,609	+ 516
Yorkshire (W. Riding)	,, 12	1,251	1,376	+ 125	15	21,175	+ 1,135

* From such of the services as were working both last year and this year the receipts show an increase of £5,320 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

Name.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Wks.	Aggregate. 1914.	Increase or Dec.
Central London.....	April 11	£5,370	£4,418	— £952	15	£77,196	— £2,817
City and South London	,, 11	2,916	2 483	— 433	15	42,133	— 2.945
Liverpool Overhead.....	,, 12	1,560	1,616	+ 56	15	24,517	+ 707
London Electric.....	,, 11	14.385	13,305	— 1,080	15	218,165	+ 1,430
Mersey	,, 11	2.310	2.259	— 51	15	34,916	+ 22
Metropolitan	,, 12	16.368	17,875	+ 1,507	15	267,253	+ 23,666
Metropolitan District...	,, 11	13.273	12,696	— 577	15	198,093	+ 578

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AMBERLEY HOUSE, NORFOLK ST., W.C.

TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, April 17.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	69 — 71
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	...	4⅝ — 4¾
5	Do. 5½% Cum. 2nd Pref.	...	4⅜ — 4⅝
100	Do. 4% Deb. Stk. Red.....	...	92½ — 94½
100	Do. 4½% Deb. Stk. Red.....	...	97 — 100
100	Do. 5% Deb. Stk. Red.....	...	96½ — 98¼
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 — 106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅝ — ¾
1	Do. 5% Cum. Pref	...	⅛ — ¼
100	Do. 4½% 1st. Mort. Deb. Stock, Red.....	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	...	85 — 87
10	Blackpool and Fleetwood Tramroad Co.	...	14 — 15
100	Bombay Elec. Supply and Trams. Co., Ord.	...	13½ — 14½
10	Do. do. 6% Cum. Pref.....	...	10¾ — 11¼
100	Do. do. 4½% Db. Stk Red.	...	94½ — 96½
$100	Brazilian Traction Light and Power Co. Lim.....	+ ½	88 — 85
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	...	7⅛ — 8
5	Do. do. 5% Cum. Pref	...	4⅞ — 5⅜
100	Do. do. 4½% 1st Deb Stock, Red. ..	...	98 —101
10	Bristol Tramways and Carriage Co.	...	6¾ — 7
10	Do. do. 4% Cum. Pref.	...	6¾ — 7⅛
100	Do. do. 4% Deb. Stock	...	100 —103
100	Do. do. 4½% Deb. Stock	...	96 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	...	117 —121
100	Do. Pref. Ord. Stock	...	105 —109
100	Do. 5% Cum. Perpetual Pref. Stock.....	+ 1	102 —105
100	Do. 4½% 1st Mort. Debs.	— 2	96 — 99 xd
4(	Do. 4½% Vancouver Power Debs.....	...	94 — 98
10(	Do. 4½% Perpetual Cons. Deb. Stk.	+ 1	94½ — 96¼
100	British Elec. Traction Co., Lim., 6% Cum. Pref.....	...	89 — 92
10(	Do. 7% Non-Cum. Pref.	...	56 — 59
10	Do. 6% Pref. Ord. Non-Cum.	...	15⅝ — 17⅛
100	Do. Deferred Ord. Stock	...	6⅛ — 8⅛
10(	Do. 5% Perpetual Debenture Stock.....	...	98 — 95
100	Do. 4½% Second Debenture Stock, Red	...	79 — 82
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	73 — 78
100	Buenos Ayres Lacroze Trams. Co., Stg. 6% 1st Mrt. Deb.	...	100 —102
5	Calcutta Tramways Co., Limited, Ord.	...	7 — 7⅛
5	Do do. 5% Cum. Pref.	...	5 — 5⅛
100	Do. do. 4½% 1st Deb. Stock, Red.	+ 1	97 —100
1	Cape Electric Tramways, Ld., ...	...	⅝ — ¾
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	3 — 3¾
100	Do. 5% Debs., Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co. (1904), Lim.	...	5¼ — 5½
100	Do. 4% Debenture Stock Red, 1935	...	91 — 96
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. ..	...	89 — 93
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	...	93 — 96
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	— 6⅞
10	Dublin United Trams. Co. (1896) Lim. Ord.	— ⅜	— 10⅜
10	Do. do. 6% Pref.	— ¼	— 12¾
100	Do. do. "A" Red.	...	— 80¾
100	Do. do. Deb. Stock "B" Red. ..	...	— 79
10	Gateshead & Dist Trys. Co., Ord.	...	8¾ — 9
10/-	Hastings & Dist. Electric Trams. Co., Ld., Ord.	...	⅛ — ⅜
1	Do. do. 6% Cum. Pref.	...	⅛ — ¾
100	Do. do 4½% Deb. Stk. Red.	...	65 — 70
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	93½ — 97½
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.).....	...	86 — 90
1(	Imperial Tramways, Ord.	...	3 — 3½
1(	Do. do. 6% Cum. Pref.....	...	6¼ — 6¾
10(	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref....	...	2 — 2¼
10(	Do. 4% Debenture Stock	+ 2	73 — 78
1	Kalgoorlie Elec. Trams., Ltd.	...	0 — 1/16
10(	Do. do. 5% "A" Deb. Stk.	...	85 — 90
10(	Do. do. 6% "B" do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.....	...	⅞ — 1
10	Lanarkshire Tramways Co.	...	9¾ — 10¼
10(	Lancashire United Tramways, 5% Prior Lien Deb.	...	87 — 89
1	Lisbon Electric Trams., Lim., Ord.	...	1¼ — 1⅜
1	Do. 6% Cum. Pref.	...	1⅛ — 1⅜
100	Do. 5% Mort. Debs.	+ 4	95 —100
1	London and Suburban Trac. Co., Lim., Ord.	...	1/16 — 3/32
100	London General Omnibus Company, Limited, 4½% Deb.	+ ½	98 —100
100	Do. Do. 5% Cum. Inc. Deb. Stk. Red.	...	89 — 92
100	London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red	— 1	58 — 63
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref.....	...	4⅞ — 5¼
5	Do. do. 5% Deb. Stk., Red.	...	101 —103
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	79 — 82
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	...	107 —110
$1,000	Do. do. 5% Bds.	...	99¾ —100¼
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	1/16 — 1/8
100	Metropolitan Elec. Trms. Ltd. 4½% Deb. Stock, Red. ..	— 1	88 — 91
100	Do. 5% Deb. Stock, Red. ..	...	85½ — 88½
100	Mexico Tramways Co., Common Stock	+ 2	71 — 74
500	Do. Gen. Con. 1st Mort. Gld. Bond.	— 1	78 — 82
100	Do. 6% 50-yr. Mort. Bonds	— 1	77 — 82
...	Michigan United Railways 5% 1st Mort. Gld. Bonds ..	...	91½ — 93½
100	Montreal Street Railway, Sterling 4½% Debs. (1922).....	...	98 —100
100	Do. 4½% Sterling Debs, (1922) ..	...	99 —101
1	National Steam Car Co. Ltd.	...	3/32 — 5/32
10	Oldham—Ashton and Hyde Elec. Ord.	...	6 — 6¼
10	Do. do. 5% Cum. Pref.	...	5¾ — 6½
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	3¾ — 4⅜
5	Do. do. 6% Cum. Pref.	...	4 — 4½
1	Perth (W.A.) Elec. Trams., Ld., Ord.	...	— —
1	Potteries Electric Traction Co., Ltd., Ord.	...	⅜ — ½
1	Do. 5% Cum. Pref.	...	11/32 — 13/32
100	Do. 4½% Debenture Stock, Red.	...	84 — 87
1	Provincial Tramways, Lim., Ord.	...	17/32 — 19/32
10	Do. 5% 1st Deb. Stock	...	96 — 98
...	Puebla Tramway, Light & Power Co., Prior Lien 5 %...	...	77 — 82
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.....	...	5 — 5½
100	Do. do. 4½% 1st Mt. Db. Stk.	...	95 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	87 — 89
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st M. 30-yr. 5% Gd. Bds.	...	97 — 99
100	Do. do. 5% 50-yr. Mort. Gold Bonds	+ ½	89¼ — 91½
10(	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	...	98 —101
$50(	Do. 5% 1st Mort. Debs., Red., 1929	...	96 — 99
1(	Shanghai Elec. Construction Co.	...	13¾ — 13¾
10(	Singapore Elec. Tramways Lim., 5% Debs. Red	...	88 — 93
...	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ...	...	⅝ — ¾
10(	Do. do. 4% Deb. Stk.....	...	66 — 70
...	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	95 — 97
10(	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	98 —100
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	83 — 85
10(	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	90 — 92 xd
5	United Elec. Tramways of Monte Video, Ord.	...	4⅝ — 5½
5	Do. do. 6% Cum. Pref.	...	4⅞ — 5¾
10(	Do. do. 5% 1st Deb. Stk. Red.	...	95 — 98
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	93½ — 95½
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	3/16 — 5/16
5	Do. do. 6% Cum. Pref.....	+ ¼	4¼ — 4¾
100	Do. do. 4½% 1st Deb. Stock. Red.....	...	83 — 86

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THE

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WEEKLY LIST OF TENDERS INVITED.

URBAN DISTRICT COUNCIL OF BEXLEY.

(a) The above Council invite tenders for the supply of Six Controllers suitable for electric tramcars fitted with two D.K. 25 A. motors and British Westinghouse solenoid controlled skid-proof, magnetic brakes. The overall dimensions of the controllers should not exceed 3ft. by 1ft. 6in. by 9in.

(b) The above Council invite tenders for Five C.I. Boxes, each containing 4 switches or fuses for 550 volt 250 amp. controlling section ends of overhead traction lines. The boxes to be suitable for clamping to tram poles 8½in. diam., and to be fitted with locks and special keys of simple pattern.

Electricity and Tramway Offices,
Broadway, Bexley Heath.

DUBLIN AND SOUTH-EASTERN RAILWAY.

TENDERS FOR PERMANENT WAY MATERIALS.

The Directors of the above Company are prepared to receive tenders for the supply of the following Permanent Way Materials, viz.:—

800 tons Bull Head Steel Rails, with corresponding Fish-plates, 400 tons to be delivered in June, 1914, and 400 tons in January, 1915.
510 tons Cast-Iron Chairs, 230 tons to be delivered in June, 1914, and 280 tons in January, 1915.
18,000 Rectangular Sleepers, 8ft. 11in. by 10in. by 5in., 5,000 to be delivered in August, 1914, and 13,000 in April, 1915.
700 Rectangular Sleepers, 8ft. 11in. by 12in. by 5in., to be delivered in August, 1914.

Specifications and forms of tender can be had on application to the Company's Engineer, Mr. S. J. Shannon, 52, Westland Row, Dublin.

Tenders, marked "Tenders for Permanent Way Materials," and addressed to the Secretary, Dublin and South Eastern Railway Company, to be forwarded so as to be received by him not later than 10 a.m. on May 6, 1914.

A. G. REID,
Secretary.

Secretary's Office,
Westland Row Station, Dublin,
April 20, 1914.

BURGH OF LEITH.

TRAMWAYS DEPARTMENT—OVERCOATS.

The Town Council invite tenders for Overcoats, Factory or Tailor Made, as may be determined, for the following—viz., 5 Inspectors, 23 Motormen, 33 Conductors, and 4 Parcel Boys, all conform to samples to be seen, and relative conditions of contract to be obtained, at the Tramway Offices, 165, Leith Walk.

Tenders, endorsed "Overcoats," along with separate samples marked with a private mark (which shall not be recognisable until the tenders are opened), must be lodged with me not later than May 13, 1914.

The Council do not bind themselves to accept any tender.

D. ROBERTSON,
Town Clerk.

Town Clerk's Office, Leith,
April 24, 1914.

LEICESTER CORPORATION.

TRAMWAYS DEPARTMENT.

OVERCOATS.

The Committee invite tenders for the supply of 350 Overcoats for Motormen, Conductors, and Inspectors for delivery in September next.

Samples may be seen on application to and tender forms obtained from the Manager, 20 and 22, Humberstone Gate, Leicester.

Sealed tenders, endorsed "Tender for Overcoats," addressed "Chairman, Tramways Committee, 20 and 22, Humberstone Gate, Leicester," must be delivered not later than Saturday, May 9, 1914.

The Committee do not bind themselves to accept the lowest or any tender.

A. F. LUCAS,
Manager.

SOUTH SHIELDS CORPORATION.

TRAMWAYS DEPARTMENT.

The Corporation invite tenders for the supply of Stores and Materials used in the Tramways Department for the period of 12 months from July 1 next. Particulars and form of tender and conditions may be obtained on application to Mr. W. Tuke Robson, Tramways Manager, Dean Road, South Shields, and samples can be inspected at the Car Sheds. Tenders, endorsed "Tender for Stores—Tramways Department," must be delivered at my office on or before Saturday, May 9 next.

J. MOORE HAYTON,
Town Clerk.

Municipal Buildings, South Shields,
April 24, 1914.

COUNTY BOROUGH OF WEST HAM.

TO ELECTRICAL CONTRACTORS, TRAMCAR BUILDERS, AND OTHERS.

The Council hereby invite tenders for:—

15 Double-Deck Bogie Electric Tramcars, and
1 Four-Wheel Single-Truck Double-Deck Electric Tramcar.

Specification, form of tender, and further particulars may be obtained from Mr. J. S. D. Moffet, Assoc.M.Inst.C.E., M.I.Mech.E., Tramways Manager, Greengate Street, Plaistow, E., on and after Monday, April 27, 1914, on the deposit of a £5 Bank of England note, which will be returned on receipt of a *bonâ-fide* tender.

Tenders, endorsed "Tender for Tramcars," to be delivered by registered post to my office not later than 10 o'clock a.m. on Saturday, May 16, 1914.

The Council do not bind themselves to accept the lowest or any tender.

The contractor will be required to enter into a bond, with two sureties, for the due performance of the contract, and no work will be ordered under the contract until such bond has been duly executed.

The contractor whose tender is accepted and with whom a contract is entered into, will be required to pay all workmen employed by him in or about the contract such rates of pay, and observe such hours of labour, as are embodied in the schedule, which will be part of the contract. In the event of any breach of such agreement the Council will enforce the penalty clause in its entirety.

A tender will not be accepted unless it is stated by the contractor in the tender, and proved to the satisfaction of the Council, that the contractor, at the date of the tender, pays to the whole of his workmen such rates of wages and observes such hours of labour as are recognised by the workmen's trade unions in the several localities where his work is done. If, after the contract is signed, it shall be proved that the said statements of the contractor in the tender are contrary to the fact, the Council shall be entitled to rescind the contract, or at their option to recover from the contractor as liquidated damages, and not as a penalty, the sum of £50.

By order of the Council,
H. W. GREAVES,
Town Clerk.

Town Hall, Stratford, E.,
April 23, 1914.

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COUNTY BOROUGH OF WALLASEY.

TRAMWAYS DEPARTMENT.

CONTRACT FOR STORES.

The Wallasey Corporation are prepared to receive tenders for the supply, over a period of twelve months, from July 1 next, of the following Stores, to be delivered at the Tramway Depôt, Seaview Road, Wallasey, viz. :—

Chilled Iron and Steel Tyred Car Wheels.
Steel Gears and Pinions.
Steel Axles.
Brake Blocks.
Trolley Heads.
Armature, Axle Box, and Motor Suspension Bearings.
Check Plates.
Cotton Cleaning Cloths and White Cotton Waste.
Axle Grease.
Lubricating and Cleaning and Paraffin Oils.

Further particulars, with forms of tender, may be had, and samples inspected on application to the Tramways General Manager, at his office, Seaview Road, Wallasey.

Sealed tenders, which must be on the printed form, endorsed "Tender for Tramway Stores," and addressed to the undersigned, to be delivered per post, at my office, as below, not later than the morning of May 12 next.

The Corporation reserve the right to accept the whole or part of a tender, and do not bind themselves to accept the lowest or any tender.

(By Order), H. W. Cook,
Town Clerk.

Town Hall, Wallasey,
April, 1914.

CITY OF YORK.

ELECTRICITY DEPARTMENT.

TENDERS FOR FEEDER CABLES.

Tenders are invited for the supply, delivery, and laying underground of High-tension Three-phase Feeder Cables and Low-tension Direct Current Cables.

Specifications and forms of tender may be had on application from the undersigned.

Tenders are to be delivered in sealed envelopes endorsed "Tender for Cables," not later than 9 a.m. on May 12, 1914.

J. W. Hame,
Engineer and Manager.

Electricity Offices, Clifford Street, York.

(Continued on page 339.)

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers,
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
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POLE PAINTS
which keep their colour and prevent rust. Kearsley's ready-mixed Pole Paints are used by important Tramway Companies the world over, and give entirely satisfactory results under extreme climatic conditions.
Robert KEARSLEY & Co., Ltd.
RIPON, England.

MILLARS' TIMBER AND TRADING CO., LTD.
PINNERS' HALL, GREAT WINCHESTER STREET, LONDON, E.C.
SUPPLY
JARRAH
THE SANITARY WOOD PAVING
REGISTERED TRADE MARK M.J.
Telegrams: "Jarrah, London." Telephone: 368 London Wall.

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Makers of Simplex Steel Conduit System and
WIRES and CABLES.
BITUMEN CABLES.
TRAMCAR HEATERS.
TRAMCAR METERS.
MEASURING INSTRUMENTS.
WATERTIGHT FITTINGS FOR CAR SHEDS.
ENCLOSED (Indicating) FUSES (to N.E. Code or English Standard).
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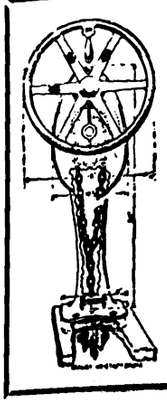

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THE
Tramway AND Railway World

Established in 1892 and Published by

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Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

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SATURDAY, APRIL 25, 1914.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

EMPLOYEES' UNION DEVELOPMENTS.

In the interests of public safety the Bury Corporation decided last year that the tramways manager should have the power of calling upon employees to undergo an independent medical examination before resuming duty after illness, even though they may have been passed by their panel medical adviser. The adoption of a similar course at Cardiff has led to the union committee recommending the men not to submit to the examination, and asking the Tramway Committee to rescind their resolution without delay. It is to be hoped that the committee will pay no attention to the request, and that any men who act upon the recommendation will be severely dealt with. Their union organiser has deluded them with the assertion that the examination may render them liable to be discharged after a temporary illness. The absurdity of the contention is patent when it is remembered that throughout the country, according to the National Insurance Commissioners, there has been a tendency for doctors to allow patients to remain too long upon the list. This complaint is supported by Mr. Jackson, general secretary of the Association of Tramway and Vehicle Workers, in his report for the year 1913. Mainly owing to the Insurance Act the association has increased in membership from 21,161 to 27,192 during the past year, and it is satisfactory to find the secretary taking a stand against syndicalist methods in his reference to the "new, and what was at one time a rather popular movement, the down tools policy." "To withhold labour and negotiate afterwards is," says the secretary, "a great mistake. Negotiate to the very fullest extent before ever thinking of withholding labour, is my advice, and I venture to say you, or anyone else, will be more successful in the end." Certainly the general secretary can point to a large number of concessions obtained by negotiation, and it may be assumed that the recent defeat of the municipal employees at Leeds will convey a salutary lesson to their fellows and to local authorities throughout the country. Efforts were made during the year to effect an amalgamation of vehicle workers' unions, but while the tramway workers submitted a scheme for a fusion for trade union purposes with a general set of rules and one governing body and a separate contribution, nothing definite resulted, as the London organisations desired to bring about the absorption of all the societies into one. There is now a stiff fight in progress between the London and Provincial Union of Licensed Vehicle Workers and the Amalgamated Association of Tramway and Vehicle Workers to secure the support of the great body of tramwaymen of London and its environs who are not union men. The way to this was opened by the unfortunate attitude of one of the omnibus companies in refusing to permit their men to wear the badge of the London organisation, with the result that under threat of a strike recognition of the union had to be conceded by all the companies. Since then the organisers have been preaching the doctrine of discontent at midnight meetings to omnibus and tramway men, and the former class of employees are shortly to present "demands" to the companies. Whatever concessions may be granted, the employers ought to resist firmly the coercive policy which the London and Provincial Union adopt at the garages of the cab companies in the form of setting apart days when agitators call upon every man to show his membership card. The elimination of this practice is one of the conditions upon which peace is about to be restored in the building trade dispute.

TO ENCOURAGE PLEASURE TRAFFIC.

Recent reports from different parts of the country should serve to remind tramway managers once more that in many places a great deal can be done to develop a summer and holiday traffic made up for the most part of passengers who do not require to use the cars, but who are simply on pleasure bent. In certain places a good deal has been done, but the field is to a large extent still unexplored. The development of what may be called touring on a small scale which has been brought about by motor omnibuses, many of them of the open variety, is a good object lesson. It is true that a large proportion of tramway routes are not of a kind to attract the pleasure rider; but even the large manufacturing towns have pleasant suburbs and places of interest in their neighbourhood which the tramways could serve for the pleasure-seeking passenger. What seems to be a very successful method of attracting business of this class is the use of open cars, preferably fitted with some sort of canopy and curtains which can be brought into use when rain comes on. It would seem that the small expense necessary to provide one or two experimental cars of the sort might well be justified in the case of a good many towns. Reports from Leeds indicate a great growth of traffic this spring by the ordinary cars on some of the recent suburban extensions, the tramway ride being combined with a walk in the country. In regard to inland towns with noted beauty spots near them, and seaside towns which are the resort of holiday-makers, experience so far seems to indicate that the open car of what is called the toast-rack or cross-seat type should be a great favourite. Blackpool has for a long time found this class of car a great success on its five-mile circular route, and it is now proposed to obtain six more of these cars, making 24 "toast-racks" in all. Wallasey, which is

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not very far away, promises to emulate this example by extending the tramways so as to form a circular route, and to run open cars in summer along the sea front. Southport has begun the working of one open cross-seat car, with such good results that three more cars are to be ordered. If these things can be done in the North, why not in the South? In various southern seaside resorts there appear to be undeveloped possibilities. Hastings, for instance, looks a promising field for the open summer car. The tramways include a splendid circular route, partly on the coast and partly inland among the hills. Extensive land and sea views are obtainable from the cars, and, if well advertised, open vehicles might bring a great increase of traffic. The obstacle is that on the part of the route along the sea-front overhead wires are prohibited, so that to complete the circuit the passenger would have to change cars. The surface-contact system having been abolished on the sea-front, petrol-electric cars are being provided. Still, it would probably be worth while to run open cars round the rest of the circuit. In view of the cost of new cars, any town making the experiment would, no doubt, begin with only a very few of the open variety, and the wisdom of further expenditure could be judged from the result. In any event, so far as pleasure resorts are concerned, a much larger number of cars are required during the season than in the wintertime, so that the question of doubling the number of cars necessarily in stock would not arise. If the experiment were a success, a substitution could gradually be made of open or convertible cars for a certain number of the closed ones, leaving enough of the latter for the wants of the winter service.

THE ANGLO-ARGENTINE TRAMWAYS.

PROGRESS IN 1913.

The report of the general manager of the Anglo-Argentine Tramways Company, Mr. G. Pedriali, for the year 1913, which is issued with the directors' report, gives much interesting information in regard to the work of the undertaking. The number of passengers carried in 1913 was 340,014,573, an increase of 7.51 per cent. over the previous year. The car mileage increased by 6.29 per cent. 130 new motor cars complete with electrical equipments, and 20 motor cars complete with trucks, but without electrical equipments, were ordered, in addition to 200 new trail cars. The company's rolling stock consists of 1,758 motor cars, and 366 large trail cars, besides 196 closed and 235 open horse traction trailers. The maximum number of cars in daily service is 1,535, which leaves a reserve of 12 per cent., but this reserve is reduced to 8 per cent. if the 82 cars which can only be employed under certain circumstances are deducted from the above stock. There has been a downward tendency in the average current consumption per car kilometre during the year, the general average for the twelve months being 630 watt hours, as against 688 in 1912, or a decrease of 58 watt hours per car kilometre run. Special efforts are being made to reduce this average still further. The municipal tax in 1913 amounted to $503,706. The percentage of working expenses to receipts has decreased from 60.52 in 1912 to 60.29 in 1913. A commencement has been made with the establishment of a pension fund. A sum of $4,000 paper per month is put aside towards this end, and all pensions hitherto granted are now charged against this fund. This has caused a favourable impression on the staff. The manager says that nearly all the main lines are now laid in recently paved streets, and service conditions could not be better. Owing to the opening of the new subway service, a certain amount of tramway traffic will be lost, but on the other hand the existence of the subway service, with transfer tickets on many of the lines, will mean the gradual development of new traffic, especially when the subway is opened to Caballito. The company have about 350 miles of electric track.

Slow Moving Government Departments and London Traffic.—In the House of Commons on April 20, Mr. D. Hall (U., Isle of Wight) asked the Prime Minister whether there was any prospect in this session or in this Parliament of any attempt being made to carry out the recommendations of the Select Committee on London Traffic, or of otherwise dealing with the dangers of the congestion of the London streets. Mr. Asquith replied: I am informed that the recommendations of the committee are being carried out, as far as is possible, administratively. Other aspects of the matter are now being considered by the departments concerned.

TRAFFIC RESULTS IN 1913-14.

BELFAST.

Mr. Andrew Nance, general manager, has issued the following summary of the accounts of the tramway undertaking for the financial year ended March 31 last:—

	£ s. d	£ s. d.
Total revenue		272,042 5 4
Working Expenses—		
Traffic	77,896 16 6	
General	12,591 18 2	
Repairs and Maintenance	40,848 12 6	
Power	28,758 1 5	
		160,095 8 7
Working Profit		£111,964 16 9
Net Revenue Charges		60,527 16 7
Net Revenue		£51,419 0 2
Deduct Sinking Fund	31,3 2 18 7	
Depre ia ion	17,000 0 0	
		48,352 18 7
Balance being Surplus Profit		£3,066 1 7

Passengers carried	63,131,820
Car miles run	6,865,591
Car mile Revenue	9.57d.
Working expenses per car mile	5.60d.
Average fare per passenger	1.02d.
Average number of passengers per car mile	9.19
Units of power per car mile	1.37

In the course of his report the manager says:—"The previously unworked route mileage brought into operation amounted to 30 per cent. over that of the system in 1913. The business on these areas had all to be worked up, and yet we have achieved results in the past year of working which I do not believe have been hitherto reached in any case where a large tramway has been extended to so material an extent. The trading profit is £112,000; last year it was £110,500. This shows an increase of £1,500. The net profit is £51,420. Last year it was £53,340. The total outgoings against revenue amount to £269,000, being an increase of about £30,400. The increase is perfectly legitimate, inasmuch as an increased business must necessarily carry with it a very considerable addition to the expenditure incurred in carrying it on. With regard to the disposal of the new profit of £51,419, this is defined by the Aberdeen clause of the Belfast Tramways Act, 1904. It has been settled that the payments to the sinking and depreciation funds shall be increased by £10,813—that is to say, from £37,540 to £48,353. Therefore the amount we should otherwise have been able to pay to the general purposes fund has been correspondingly reduced to £3,066." Mr. Nance quotes the Board of Trade report for 1913 to show that the Belfast total of 5.60d. for working expenses per car mile is the lowest of any of the forty other large Corporation tramways, and he adds:—"This high standard of economic working has not been obtained either by the sacrifice of efficiency or by paying lower wages to the staff than the other tramways."

LEEDS.

Mr. J. B. Hamilton on April 20 presented to the Tramways Committee the following statement upon the working of the Corporation tramways during the year ended March 31 last:—

	£ s. d	£ s. d
Traffic Revenue		423,516 6 1
Sundry Revenue		3,939 1 11
Total Revenue		427,455 8 0
Working Expenses		226,382 11 5
Gross Profit		201,072 16 7
Interest on Capital	42,176 16 0	
Less Bank Interest and Dividends on Investments	8,354 4 4	
	33,822 11 8	
Interest and Sinking Fund—Sovereign Street Estate	4,766 12 0	
Rental of Morley Tramways	3,223 10 3	
Contributions to Sinking Fund	51,932 9 9	
Permanent Way Renewals	31,576 1 1	
Contributions to Costs of Act	403 2 7	
Income Tax	5,343 18 4	
		131,068 5 8
Net Surplus in Relief of Rates		£70,004 10 11

	1913–1914	1912–1913	Increase
Total receipts	£427,455	£411,531	£15,924
Number of miles run	9,204,331	8,795,465	408,866
Numbers of passenger carried	93,079,774	89,668,185	4,011,589
Receipts per mile	11.145d	11.229d.	—
Average fare paid per passenger	1.081d	1.088d	—
Population served	525,000	525,000	—
No. of times population carried	178	171	7
Amount paid per head of population	16s. 1d	15s. 3d.	10d

The total working expenses were 5.902d. per car mile, made up of traffic expenses (including wages 2.167d.), 2.967d.; general expenses, 1.073d.; general repairs and maintenance, 1.070d.; and power expenses, 0.792d. The gross profit per car mile was 5.243d., while the net surplus was 1.825d. per car mile. Among the chief items of expenditure were the following:—Wages to motormen and conductors, £79,899 (an increase of £2,456); rates and taxes, £22,377 (an increase of £2,500); car repairs, £24,623; fuel, £16,828. The amount to be devoted to relief of rates is the largest sum that has yet been available for that object. In 1906-7 a total of £69,000 was so appropriated. The traffic receipts show an increase of nearly £16,000. About £10,000 less was expended on the permanent way owing to labour troubles and unfavourable weather, but a larger sum was allotted to the sinking fund. The manager and his staff were congratulated by the committee on the outcome of the year's work.

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LONDON GENERAL OMNIBUS COMPANY'S DINNER.

The sixth annual dinner of the official staff of the London General Omnibus Company, Limited, took place on Saturday, April 18, at the Hotel Cecil, Mr. C. J. Cater Scott, chairman of the board, presiding over a company numbering nearly 500. He was supported by Mr. John O'Connor, M.P., Mr. W. Joynson-Hicks, M.P., several members of the L.G.O.C. Board, directors of allied companies and the principal officers of the company. During the evening the toast of "The Company" was proposed by Mr. John O'Connor, M.P., who referred to the articles in the daily press with regard to the passing of the horse 'bus as ending the romance of the road. He said that, in his opinion, the motor 'bus was a development which outpaced the romance of old.

The chairman, when replying to the toast, paid a warm tribute to the work of the managing director, Mr. A. H. Stanley, whose absence through illness was so much deplored, and referred appreciatively to other officers of the company. In the course of his remarks he announced that the omnibuses had carried last year over 676 million passengers, the 'bus mileage run being about 105 millions. The company's receipts had amounted to over £3,250,000, of which £1,500,000 was the amount of the annual pay roll. The staff numbered 18,000, of whom 10,000 were 'bus drivers and conductors; and the Associated Equipment Company, in addition, employed about 1,200. The number of 'buses operated was 3,000, running over routes measuring 520 miles. The results of the Easter traffic had been specially gratifying, nearly 2½ million passengers having been carried on Easter Monday alone.

The toast of "The Visitors" was proposed by Mr. H. E. Blain, operating manager, and replied to by Mr. W. Joynson-Hicks, M.P., and the health of the Chairman was proposed by Mr. R. S. Tilling.

MISCELLANEOUS NEWS AND NOTES.

More Trail Cars for London.—The Board of Trade have sanctioned the application of the London County Council to run additional trail cars.

L.C.C. Tramways Easter Traffic.—The approximate returns for Easter week show receipts totalling £47,372 from 10,405,637 passengers on 143 route miles open as against £41,227, 9,504,559 passengers and 144 miles open for Easter week of last year.

Goods Traffic on Tramways.—Bury and District Chamber of Commerce have appointed a deputation to urge upon the Tramways Committee the advisability of convening a conference of local authorities around Manchester for consideration of the possibility of using the tramways for goods traffic at night.

More Open Single-Deck Cars for Southport.—Notwithstanding the existence of motor chars-a-bancs and horse-drawn vehicles of the same type, great success has attended the running of a toast-rack car obtained by the tramways department. The Committee have decided to recommend the Council to obtain three additional cars.

Season Tickets.—In mentioning, at the annual social meeting of the Perth Corporation Tramways' employees, the recent adoption of season tickets in order to increase the revenue, Ex-Bailie Calderwood, chairman of the Tramways Committee, said it was flattering to Perth that the London County Council had been making inquiries with regard to the scheme.

New Tramways for Preston.—At a cost of £26,000 the Corporation propose to construct two new tramways when Parliamentary powers have been obtained. One line will give the northern and central districts a shorter means of reaching the central railway station, and the other line will bring traffic to the existing tramways from the south-eastern portion of the town.

Portsmouth and Top-Covered Cars.—The Tramways Committee have deferred further consideration of the question of providing top covers until new cars are ordered. It has been ascertained that the cost of obtaining and fixing six cars with top-roof covers would be £120 each, and that owing to a bridge it would be impossible for the height to be more than 5ft. 7½in.

Overhead Equipment for Adelaide.—The *Board of Trade Journal* reports that tenders are required by the Adelaide Tramways Trust for the supply and delivery of overhead tramway equipment. Tenders must be received by 3 p.m. on May 26. A copy of the specifications and conditions of tender may be seen at the Commercial Intelligence Branch of the Board of Trade.

Experiment in Cushioned Seats.—With a view to obtaining the opinion of passengers upon the innovation, a Croydon Corporation tramcar is to be fitted with cushions to the lower deck seats. The change is likely to be favourably received, not only because it will give passengers the more comfortable seat to be found in the competing omnibuses but also because the cushions cause less wear to clothing.

Mexico Tramways Company's common stock fell 10 points this week to 66½. The cars are still running apparently without interruption, but the outbreak of hostilities will inevitably interfere with its arrangements. Although the registered offices are in London, all cars not built in its own shops were obtained from the United States, practically all of them having been built by the J. G. Brill Company at their Philadelphia shops. The tramways system of the city of Mexico was described and illustrated in our issue of January 15 last.

The Institute of Metals.—Professor E. Heyn, of Berlin, is this year to deliver the May lecture before the Institute of Metals. Professor Heyn, who has made a life-long study of the subject, has given the title of his discourse as "Internal Strains in Cold Wrought Metals, and some Troubles Caused Thereby." Professor Heyn's discourse will be given in the building of the Institution of Mechanical Engineers, Storey's Gate, Westminster, S.W., under the chairmanship of Admiral Sir Henry Oram, the President of the Institute of Metals, on Tuesday, May 12, at 8.30 p.m. The Secretary of the Institute, Mr. G. Shaw Scott, of Caxton House, Westminster, S.W., will be glad to forward tickets to any readers who may desire to be present.

Edison-Swan Electric Fans.—A timely folder has been issued by the Edison and Swan United Electric Light Company, Ltd., of Ponders End, Middlesex, illustrating and describing their convertible fans. These fans can be used on the table or as bracket fans, and they run with remarkably little noise and are quite sparkless. They are finished in jet black stove enamel, and the blades are guarded with a ring wire guard. The fans can be run at three different speeds, and are in every way serviceable.

West Ham Corporation, as will be seen in our advertisement columns, are inviting tenders for 15 bogie cars. The Corporation now have 118 cars, and are much in need of additional rolling stock. At present the tramways are feeling the motor omnibus competition severely; but it is recognised that as soon as an equitable charge for road maintenance is placed on the omnibuses many of these vehicles will be withdrawn; for it will then not pay the omnibus proprietors to run their vehicles except on routes where a fair profit can be obtained.

A Loop to Avoid Congestion.—Cardiff Tramways Committee have asked the city engineer to report on the cost of a scheme, submitted by Mr. A. Ellis, the manager, which the Committee have approved, for the construction of a loop from the end of Working Street to the Monument and Mill Lane, where it is proposed to double the track. At present in holiday times much congestion and loss of time are caused by the running of cars into a siding at the Monument. The loop would enable cars from Roath, Penylan Road, Newport Road, and Cathays to be kept in traffic.

All-Night Car Service for Glasgow.—The Corporation on April 16 decided to institute a service of cars at 1, 2, 3, and 4 a.m. from the centre of the city, returning from the termini at the half-hours. Mr. J. Dalrymple, the general manager, has reported that if the earnings reach 4d. per car mile, as has been the case in Manchester, he will be agreeably surprised. This would give a revenue of £2,707 per annum, while the working expenses would be £5,327. As the traffic may be looked upon as very largely a one-way traffic, he thinks the average revenue will not exceed 3d. per mile, which would mean a loss of over £3,300.

Tramways and Light Railways Association.—The April issue of the Journal of this Association notifies that the annual congress will be held on Thursday and Friday, July 16 and 17, at Newcastle-on-Tyne. Among the contents of this month's issue are the report of the Departmental Committee on Local Taxation; the award of Mr. A. J. Ram, K.C., the arbitrator on the question of the purchase price of the Colne Light Railway Company; the decision of the Light Railway Commissioners in the application with reference to the Dearne Valley Light Railways; and extracts from the report of Mr. J. M. McElroy on "The Passenger Transportation Problem."

Large Forthcoming Outlay on Cars and Rails at Manchester.—At a meeting of the Tramways Committee on April 21, it was reported that the expenditure during the past year amounted to £925,720. For the present year the committee estimated their expenditure (on revenue account) at £950,600, which balances with the estimated income. It is estimated that during the current year the estimated outlay on capital account will be £160,000, as against £116,000 last year. The estimate includes £51,000 for cars and car equipment, £25,000 for street improvements, £30,000 for new lines, and £52,000 for buildings. Out of the past year's profits it is proposed to give £100,000 in relief of rates. Last year the Corporation appropriated £103,000 for that purpose.

Worcester Tramways Company and Track Maintenance.—By a majority of three Worcester City Council have decided to adhere to the present arrangement of the local authority executing the repairs to the tramway track, the Streets Committee having proposed that the company should be allowed to do the work themselves. Councillor Ward stated that the company could not make a worse job of it than had been made during the past ten years, that the Corporation had not the proper staff to do the work, and that the company kept a staff of men whom they could take from one town to another. Alderman Walter Caldicott said that the repairs had cost the Corporation nearly £600 more than they could legally get back from the company. He admitted the company stated that they were going to save money by the arrangement, but, as they were good customers for electricity, he did not see why the Council should object to the company doing so.

Bristol Tramways Company's Opposition to the Corporation Bill.—A petition asking to be heard by counsel against the Corporation (Tramways) Bill, which comes before a Committee of the House of Lords next week, has been deposited by Bristol Tramways and Carriage Company. The petitioners state that the Corporation are not entitled to give notice that they intend to purchase any of the tramways at any time whatever until the Corporation have obtained the approval of the Board of Trade to their giving such a notice. Before granting any such approval the Board would allow the petitioners to show cause against the granting of approval. If the Bill become law it would inevitably be used by the Corporation as arguing that the approval of the Board of Trade was either not needed or was a mere matter of form, inasmuch as Parliament in giving the Corporation power to work had impliedly approved of purchase by the Corporation. If the Bill were passed into law the omnibus service, the light railway, and the Clifton Rocks Railway would remain in the hands of the petitioners, and the result would be overlapping and competition.

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CONTRACTS AND ORDERS.

Portsmouth Council have placed a contract for the supply of cable with the British Insulated and Helsby Cables, Limited.

Thomas Tilling, Limited, have been awarded the contract for the conveyance of mails by motor vehicles between Leeds and Sheffield.

Siemens Bros. Dynamo Works have received the annual contract to supply Wotan, Tantalum, and carbon lamps to Salford tramways.

British Westinghouse Company have received a contract for the supply of a 3,000 kw. turbo-generator, with exciter, to Wallasey Council, at £5,489.

Merryweathers have obtained the contract for supplying a first-aid 60 h.p. motor carriage and fire extinguishing appliances and pumps to Great Yarmouth Council.

Crompton and Co., Limited, have received a contract from Luton Tramways and Electricity Committee for the supply and fixing of a balancer at the generating station.

Wolverhampton Council have placed the following contracts:—Three motor equipments, Dick, Kerr and Co., Limited; extensions to the power station, Messrs. T. and S. Ham.

John Baker and Co. were the successful tenderers for supplying steel tyres for tramcars to Walthamstow Council for a period of one year, at £15 10s. per ton, less 2½ per cent.

Plymouth Council have accepted the tender of the Glasgow Numerical Ticket and Check Book Printing Company for the supply of tramcar tickets from April 1, 1914, to March 31, 1917.

J. W. Courtenay, Limited, have recently secured renewals of their contracts for the advertising rights on the Keighley Corporation tramways, motor 'buses, trackless trolley cars, and on the Aberdeen Suburban Tramways.

Belfast Tramways Committee have re-affirmed their resolution (referred back by the Council for reconsideration) accepting the tender of Dick, Kerr and Co. for renewal and reconstruction of tramway track during the next twelve months.

The War Office have placed contracts for the supply of motor lorries with Clayton and Co. (Huddersfield), Limited, Leyland Motors, Limited, J. I. Thornycroft and Co., Limited, Walker Bros. (Wigan), Limited, and the Pagefield Ironworks.

Melbourne Railway Electrification.—Messrs. Merz and McLellan have accepted the tender of the British Insulated and Helsby Cables, Limited, at approximately £300,000, for overhead equipment required in the electrification of Melbourne suburban railways.

Mr. John Taylor, of 7, Strand Street, Liverpool, has received an order from Manchester Corporation for 400 Taylor's patent tubular sand controllers. This order is the second year's contract. Newport (Monmouth) Corporation have also ordered 100 Taylor's controllers.

Glasgow Council have awarded contracts as appended:—Special trackwork, Lorain Steel Company and Titan Trackwork Company, Limited; torch lamps, J. T. Donald and Co.; steel work for new turbine foundation at Pinkston power station, Redpath, Brown and Co., Limited.

The Albion Motor Car Company, Ltd., of Scotstoun, Glasgow, have recently received through their concessionaires for New Zealand, Messrs. Grapes and Riley, an order for a 15 h.p., 20 cwt. "Albion" car for the tramways and electric lighting department of the Wellington City Council.

Belfast Council have allotted contracts for the annual supplies to the tramways and electricity department as subjoined:—

Trolley heads, Till and Whitehead, Ltd.; insulating material, Spicer Bros.; tramcar fittings, screws, nails and hinges, Till and Whitehead, Ltd.; iron castings, J. and J. McKeown; malleable iron castings, Hopyard Foundries Co., Ltd.; springs, W. Griffith and Sons, Ltd.; electrical accessories, General Electric Co.; lamps, Siemens Bros., Ltd.; carbon-filament lamps, Edison and Swan; metal-filament lamps, General Electric Co.; overhead line materials, A. Wiseman, Ltd.; vulcanised bitumen cables, Callender's Cable and Construction Co., Ltd.; bitumen, W. H. Keys, Ltd.; street box frames and crown, Gregg, Sons and Phenix, Ltd.; cast-iron pipes, Stanton Ironworks, Ltd.; wrought-iron pipes, Wellington Tube Works; feeder pillars, copper cable, connections, &c., W. Lucy and Co., Ltd.; arc lamp carbons, Sloan Electrical Co., Ltd.; stoneware, troughing, Doulton and Co., Ltd.; conduits, T. Wragg and Sons; electric meters Chamberlain and Hookham; time switches, Venner Time Switches, Ltd.; maximum demand indicators, Reason Manufacturing Co., and B. I. and H. Cables, Ltd.

PERSONAL.

Mr. W. Fraser has been appointed station superintendent at Barking electricity works.

Mr. B. Sankey, late borough electrical engineer at Whitehaven, has been appointed to a similar position at Port Elizabeth, South Africa.

Mr. A. Harman, engineer in the repair works of Aberdeen tramways, has been presented with a case of pipes on leaving the department to take a position with a local firm.

Sir Henry Kimber was re-elected a director of the Calcutta Tramways Company at the annual meeting. Sir Henry, who is also chairman of the South Indian Railway Company, was referred to as a most useful member of the board.

Mr. A. E. Wray, late assistant manager of the South Metropolitan Tramways Company, has taken up the duties of his new appointment as manager and engineer of the Gravesend and Northfleet Tramways Company and the North Kent Motor Omnibus Company.

Mr. Alfred de Rothschild has again given an annual donation of £100 to the funds of the St. Mark's Traffic Workers' Brotherhoods of the United Kingdom. In the April issue of the magazine the Rev. Dr. Darlington announces that the badge is now being worn by members engaged on the National Steam omnibuses.

Mr. Peter Fisher, general manager, Dundee tramways, was charged by Councillor Noble with endeavouring to throw dust in the eyes of the Tramways Committee on April 20 during a discussion on the proposed withdrawal of the trailless trolley car service. Mr. Fisher replied that no man would taunt him that he was not telling the truth, and he asked Mr. Noble to withdraw the statement. Councillor Noble: I withdraw it.

Messrs. T. E. Pallant and **W. P. Allen,** the joint general managers of Calcutta Tramways Company, the latter also being the chief engineer, were, together with the staff, complimented by Mr. E. C. Morgan, chairman, at the annual meeting on April 22. They had, he remarked, largely contributed to bringing about the excellent result of the past year's trading. The meeting passed a resolution expressing appreciation of the work of the officers and staff.

Mr. J. Pollock, chief accountant to Dublin United Tramways Company, died after a short illness on April 17, at the age of 54 years. He entered the company's service 36 years ago, and was held in high esteem by all the officials and employees. For a number of years he was secretary of the Tramway Cycle Club, a flourishing organisation.

FINANCIAL REPORTS AND MEETINGS.

Halifax Corporation Tramways.—For the year ended March 31 this undertaking had an income of £109,666, the expenditure being £95,416, leaving a gross profit of £14,250. The passengers numbered 20,270,077, as against 19,450,923 in the previous year, and the miles run were 2,242,056, as against 2,152,371 in the preceding twelve months. On the motor omnibus service there was a loss of £232 on an income of £2,783. As the cost of the vehicles has been defrayed entirely from the revenue, there should be a considerable profit for the present year.

The British Electrical Federation.—The traffic statement for the week ended April 17, 1914, shows that the receipts from tramways and railways amounted to £52,078, as compared with £36,512 in the corresponding week last year, and from omnibuses £17,835, as compared with £4,865, making a total of £69,913, as compared with £41,377. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year (Easter week) the receipts show an increase of £16,686 upon the week.

Indian Electric Supply and Traction Company.—In their report for 1913 the directors of this Cawnpore undertaking give the surplus as £10,145, against £8,459 in 1912. The balance at the credit of profit and loss account is £7,060, out of which £3,000 has been placed to reserve, and a dividend of 4 per cent. for the year is recommended, carrying forward £940. The following traction statistics are given:—Miles of tramway, 3½; number of cars, 20; passengers carried, 2,869,484; mileage run, 269,328; receipts per car mile, 4.80d.; expenses in India, 4.65d.; average fare per passenger, .45d.; units delivered to tramway, 261,960; average price per unit, 1.50d.

Southport Tramways Company.—In their report for 1913 the directors give the traffic receipts as £16,988, as against £15,672 for the previous year. They recommend that the balance of £1,355 (as against a balance last year of £79) be applied, £1,250 to reserve and £106 carried forward. Although over 232,000 more passengers were carried, the charges for power and running expenses were reduced from £6,187 to £5,933. The number of passengers carried was 3,208,879, as against 2,975,501 in 1912. The average receipts per passenger were 1.27d. in 1913 and 1.26d. in 1912. The average working expenditure per passenger was .74d. in 1913; .79d. in 1912; and .82d. in 1911. The proportion of expenses to receipts is 58 per cent., as against 63 per cent. in the two previous years.

Increased Speed Brings Higher Receipts at Reading.—The Mayor (Alderman Field), who is chairman of the Tramways Committee, at the April meeting of the Corporation, said that previous to the past year the highest receipts of the tramways were £32,543, in 1911; this year the total would exceed £36,900. The increase had been very largely due to the acceleration in the speed of the cars, which had come to be very much appreciated by the public. They ran 26,000 extra car miles during the year. The receipts per car mile formed a record, being 9.2 of a penny against 8.64 last year. The nearest approach to that figure was 9.08 in the first year of the undertaking. The parcels express service showed an increase of £138. It was not to be supposed, however, that a large sum could be given to the relief of the rates, as the rails, which had been in use eleven years, would shortly require renewal. The overhead equipment would also need renewal.

Musselburgh and District Electric Light and Traction Company.—The report for 1913 shows a net revenue of £7,290. Interest on debentures absorbs £4,427, and £511 is set aside for redemption of debentures, leaving £2,351. Out of this there is put to reserve and renewals account (tramways) £1,600 (lighting) £400, and £257 is carried forward. The profit on the lighting shows an increase of £30, notwithstanding that the amount received for energy supplied to the tramway shows a decrease of about £400, due to the more efficient working of the tramways and re-arrangement of the service. Mr. J. B. Schlesinger, who presided at the annual meeting, said that although the tramways showed an increase of nearly £1,000 in revenue, there was a reduction of nearly 19,000 in the car miles run, with a consequent decrease in the running expenses. The reserve and renewals account during the year was charged with the cost of renewals to the permanent way, renewals to the cars, and depreciation for a motor 'bus sold. They had replaced nearly the whole of that expenditure by appropriating £2,000 out of the year's profits.

Calcutta Tramways Company.—The ordinary general meeting was held on April 22 at 1, Queen Victoria Street, E.C. Mr. E. C. Morgan, who presided, said that the year to December 31, 1913, constituted a record. To the capital expenditure there had been

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added the sum of £6,239, which was represented by the cost of the freehold land at Shambazar acquired for the turning loop, new plant installed at the power house for lighting purposes, six new trail cars, and workshop plant. The traffic receipts made a fresh record, the increase over the previous year amounting to over £10,000, directly attributable to the continued steady growth of the business. This was also the first year to elapse since the transference of the capital to Delhi. On the expenditure side of the revenue account there was an aggregate decrease of £0,523, due to reductions in power expenses, under fuel, and, under maintenance and repairs, in materials, consequent on the expenditure incurred on the overhaul of the plant in the previous year. They had now put in hand, under a scheme proposed by their joint manager and chief engineer, Mr. Allen, the installation of a rotary converter sub-station at Dalhousie Square, and it was to provide for the expenditure in connection with this scheme that an opportunity was taken of issuing the balance of the 2,705 preference shares.

Anglo-Argentine Tramways Company.—The report of the directors for the year 1913 shows that the gross receipts amounted to £2,963,192, and the working expenses to £1,969,161. Adding the interest on investments and the balance brought forward from 1912, and deducting interest, and municipal and other charges, there is a balance of £232,796. The interim dividend on the ordinary shares for the half-year ended June 30 amounted to £100,000, and from the balance the directors recommend that a final dividend be paid, which, with the interim dividend, will be equal to 6¾ per cent. on the total issued ordinary share capital of £3,250,000. This leaves a balance of £13,421 to be carried forward. The first subway line, Plaza Mayo to Plaza Once, where, at the terminus of the Buenos Ayres Western Railway, a joint underground station has been constructed, was opened to the public on December 2, 1913, a distance of 2 miles 820 yards. The work in connection with the construction of the extension of this line to Caballito, where it will come up to the surface, is being rapidly pushed forward, and it is hoped will be opened for traffic for the whole distance in August. The board referred with regret to the death of three directors, Mr. V. Fris, Mr. T. Frame Thomson, the deputy chairman, and Mr. E. A. Lazarus-Barlow, who was for fifteen years a member of the board. These three vacancies have been filled by the election of Mr. L. Cassel, Mr. W. F. Hamilton, K.C., and Mr. G. A. Touche, M.P., subject to the confirmation of the shareholders. The board specially desire to acknowledge the services rendered during the past year by the members of the local committee, the general manager, and the staff of the tramways generally both at home and abroad.

(Continued from page 334.)

POSITIONS VACANT.

THE RANGOON ELECTRIC TRAMWAY AND SUPPLY COMPANY, LTD.

Wanted, Superintendent to take charge of the Rangoon Power Station. Must have had previous experience of turbo-alternators. Salary to commence with, Rs.500 per mensem, with quarters at the Power Station. Apply, with full particulars of previous experience, age, and copies only of testimonials, to the Secretary, Rangoon Electric Tramway and Supply Company, Limited, 3 and 4, Great Winchester Street, London, E.C.

MAIDSTONE CORPORATION TRAMWAYS.

Linesman Armature Winder wanted. Apply, stating age, wages required, and full particulars of experience, to

A. T. Lambert,
General Manager.

Tonbridge Road, Maidstone.

SHANGHAI.

ASSISTANT MAINS ENGINEER AND MAINS FOREMAN.

The Shanghai Municipal Council require the services of an Assistant Mains Engineer and also of a Mains Foreman.

The Assistant Mains Engineer must be thoroughly experienced in the designing and laying of feeder and distributing systems of large 3-phase undertakings where underground and also overhead mains are used.

Salary will be 250 taels per month (equivalent to about £30) with first-class passage *viâ* Siberia out and home. The first engagement will be three years.

The Mains Foreman must have had good experience with the erection of overhead cables and preferably of heavy electric light and power work.

Salary will be 200 taels per month (equivalent to about £25) with second-class passage *viâ* Siberia out and home. The first engagement will be for three years.

Applicants for both appointments must be unmarried and are subject to strict medical examination.

Applications, together with copies of recent testimonials and two personal references, to be sent to Messrs. Preece, Cardew and Snell, 8, Queen Anne's Gate, Westminster, S.W., on or before Thursday, April 30. Envelopes to be marked:—"Shanghai Assistant Mains Engineer" or "Shanghai Mains Foreman" in top left-hand corner.

POSITION WANTED.

ENGINEER.

With practical and commercial experience, desires appointment. Several years' experience in Electric Traction work in all details from construction to running. Thoroughly accustomed to management and control of men. Ten years' general manager. Highest testimonials. Box 77, The Tramway and Railway World, Amberley House, Norfolk Street, London, W.C.

WEEKLY TRAFFIC RETURNS.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended April 18, which included the Easter holiday, give total receipts of £275,655, or £59,196 more than in the corresponding week last year. The total length of track was 2,863 miles, or 24 more than for the corresponding week. Receipts were at the rate of £96 5s. 7d. per track mile, an increase of £20 0s. 9d. as compared with the corresponding week of last year. Owing to the fine weather during Easter week the receipts this year were exceptionally high.

COPPER AND ALUMINIUM MARKET.

April 24, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton:—

	Friday, April 24.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	63 0 0	65 0 0	67 2 6
,, (three months)	63 0 0	64 2 6	67 5 0
Electrolytic Copper—bars or ingots	65 15 0	67 0 0	72 5 0
Aluminium—bars or ingots	83 0 0	83 0 0	89 0 0

COAL MARKET.

April 24, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows:—

	Friday, April 24.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.		s. d.	s. d.
Best Admiralty Welsh (large)	23 6			
Best Seconds	23 0		25 9	26 9
Ordinary Drys	20 6		25 0	26 3
Best Washed Nuts	20 6		23 6	24 6
Best Washed Peas	19 6		22 0	
Cardiff, f.o.b.—			20 6	
Best Admiralty (large)	19 9			
Best Seconds	18 6		21 3	21 9
Ordinary Drys	16 0		20 6	21 3
Best Washed Nuts	10 0		19 0	19 6
Best Washed Peas	15 0		17 6	
Newcastle, f.o.b.—			16 0	
Best Steams	14 0			
Best Seconds	13 0		17 0	17 3
Smalls	3 0		14 9	16 0
			12 3	10 9

Owing to the miners' strike there were no quotations.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregate. Wks.	Aggregate. 1913-4.	Increase or Dec.
Anglo-Argentine	April 15	£54,424	£53,529	15	£854,829	+ £20,728
Auckland (28 days)	Mar. 13	19,566	23,332	37	182,422	+ 3,327
Ballarat and Bendigo	March	8 904	4,151	50	47 694	— 701
Brazilian St. Rly. Mlrs	March	46,496	51,582	34	423,040	+ 65,379
Brazilian Traction	April 18	93,097	93,649	16	1,519,246	+ 592
Brisbane	March	26,370	28,325	13	81,915	+ 7,375
British Columbia $	Feb.	688,333	704,003	35	6,034,831	+ 352,403
Buenos Aires Pt. & City	October	6,615	7,442	45	68,109	+ 5,294
Buenos Aires Lacroze	March	48,227	45,222	39	402,125	+ 7,115
Calcutta Rs	April 18	66,096	66,488	15	10,85,948	+ 49 624
Cape Town	Feb.	...	13,342	...	...	...
Carthagena & Herreria	March	8,695	2,425	13	8,120	— 1,952
Cordoba	Feb.	11,795	12,676	47	145,718	+ 12,767
East India	March	1,760	1,884	35	15,402	+ 610
Kalgoorlie	March	2,862	2,476	13	6,985	— 1,255
La Plata	March	5,771	5,178	13	15,240	— 1,048
Lima	Feb.	32,206	33,680	9	71,758	+ 5,423
Lisbon Mlrs.	Jan.	...	156,175	4	156 175	...
Madras (14 days) Rs.	April 15	26,766	34,504	15	202,730	+ 17.659
Melbourne	Feb.	62 500	64,000	9	132 500	+ 3,000
Mexico $	March	606,411	617,654	13	1,750,819	+ 253,412
Montevideo	March	34,140	32,630	21	170.531	+ 855
Para	April 19	4,170	3,469	20	69.459	— 13,500
Port Elizabeth	Feb.	...	3,510	...	...	...
Puebla $	March	62 500	67 300	13	195.400	+ 28,800
Shanghai $	April 22	20,652	24,400	16	384 600	+ 63.235
Singapore $	April 18	11,432	11,559	15	192,273	+ 9,611
Toronto $	Feb.	718,313	777,693	9	1,625,628	+ 130,387
Winnipeg $	Feb.	320.431	350,977	9	733 648	+ 61,720

DICK, KERR & CO.,
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ENGINEERS & CONTRACTORS.

Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Name.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1913-4.	Increase or Dec.
Aberdeen Corporation..	April 15	£1,389	£1,662	+ £273	46	£73,155	+ £4,214
Accrington Corp.	,, 18	531	758	+ 227	2	1,408	+ 223
Ayr Corporation	,, 18	225	375	+ 150	48	17,165	+ 2,496
Bath Electric	,, 15	748	1,393	+ 645	15	11,500	+ 602
Birkenhead Corp.	,, 19	1,169	1,374	+ 205	2½	3,544	+ 223
Birmingham Corp.	,, 18	11,594	14,319	+ 2 725	3	34,448	+ 3,194
Blackburn Corporation	,, 15	1,166	2,154	+ 988	3	4,542	+ 1,023
Blackpool Corporation	,, 16	548	3,478	+ 2,930	2½	4,465	+ 2,704
Bolton Corporation	,, 19	2,637	3,012	+ 385	3	3,485	+ 1,022
Bournemouth Corp.	,, 22	1,986	2 187	+ 201	3	7,318	+ 1,516
Bradford Corporation...	,, 18	5,458	8,094	+ 2,636	3	18,115	+ 2,993
Brighton Corporation...	,, 19	878	1,363	+ 485	3	3,210	+ 789
Bristol	,, 17	6,915	11,497	+ 4,582	15½	118,279	+ 10,606
British Elec. Federatn.	,, 17	41,877	69,913	*	...	...	...
Burnley Corporation ...	,, 18	1,568	1,835	+ 267	3	5,531	+ 742
Burton-on-Trent Corp.	,, 19	271	326	+ 55	3	851	+ 77
Bury Corporation	,, 19	1,307	1,524	+ 217	3	4,239	+ 566
Cardiff Corporation	Mar. 21	2,450	2,653	+ 203	51	137,876	+ 12,453
Chatham and District..	April 16	799	1,343	+ 544	15	12,977	+ 347
Chesterfield Corp.	,, 16	241	341	+ 100	2	671	+ 114
Colne Corporation	,, 4	238	249	+ 11	...	...	...
Cork Electric	,, 16	476	523	+ 47	15	6,884	+ 40
Croydon Corporation ..	,, 10	1,468	1,780	+ 312	1½	2,481	+ 180
Darlington Corporation	,, 14	230	296	+ 66	3	811	+ 147
Derby Corporation	,, 18	941	1,223	+ 282	2½	2,939	+ 471
Dover Corporation	,, 18	201	302	+ 101	3	692	+ 130
Dublin & Lucan	,, 17	132	185	+ 53	15	1,829	— 67
Dublin United	,, 17	6,122	6,248	+ 126	16	81,619	+ 2,901
Dundee City	,, 22	1,271	1,353	+ 82	49	63,767	+ 4,191
East Ham Corporation	,, 18	1,076	1,197	+ 121	2½	2,878	+ 118
Exeter Corporation	,, 17	297	479	+ 182	3	963	+ 189
Gearless Motor 'Buses.	,, 18	...	525	...	16	7.125	...
Glasgow Corporation ...	,, 18	20,191	21,572	+ 1,381	16	944,274	+ 66,867
Glossop(U.Elec.Supply)	,, 18	122	139	+ 17	16	1,940	— 9
Halifax Corporation ...	,, 14	1,898	3,039	+ 1,141	2	5,023	+ 1,083
Hastings & District.....	,, 15	804	1,618	+ 814	15	11,690	— 22
Huddersfield Corp.	,, 18	2,046	3,243	+ 1,197	3	6,874	+ 1,393
Hull Corporation	,, 18	3,020	3,453	+ 433	3	8,748	+ 864
Ilford U.D.C.	,, 18	444	617	+ 173	2	1,448	+ 347
Ilkeston Corporation ...	,, 15	121	166	+ 45	3	416	+ 71
Ipswich Corporation ...	,, 18	378	551	+ 173	3	1,271	+ 395
Isle of Thanet	,, 18	398	873	+ 473	29	10,469	+ 1,006
Kilmarnock Corp.	,, 18	160	181	+ 21	48	8,392	+ 517
Lanarkshire	,, 16	1,575	2,030	+ 455	15	37,856	+ 3,669
Lancashire United	,, 15	1,435	2,387	+ 952	15	23,871	+ 3,124
Leeds City	,, 18	7,869	10,179	+ 2,310	3	23,793	+ 4,367
Leicester Corporation...	,, 18	2,716	3.509	+ 793	16	44,156	+ 2,929
Leith Corporation	,, 18	623	718	+ 95	48	33,925	+ 1,666
Leyton U.D.C.	Mar. 26	1,466	1,252	— 214	51½	68,140	— 155
Liverpool Corporation..	April 18	12,288	13,951	+ 1,663	15½	198,725	+ 11,339
Llandudno & Colwyn B.	,, 17	208	514	+ 306	20	3,514	+ 42
London County Council	,, 15	40,400	47,496	+ 7,096	2	97,289	+ 9,356
London Gnl. Omnibus..	,, 18	59,596	74,008	+14,412	16	906,357	+ 27,296
London United	,, 17	5 509	9,350	+ 3,841	16	87,958	+ 4,514
Lowestoft Corporation	,, 18	122	324	+ 202	23	5,196	+ 678
Maidstone Corporation	Mar. 19	159	159	Nil	51	9,938	+ 647
Manchester Corp.	April 18	16.991	19,231	+ 2,240	3	48,263	+ 5,107
Met. Elec. Trys.	,, 17	8.612	11,757	+ 3,145	16	134,791	+ 4,155
Nat. Steam Car Co., Ld.	,, 21	2,744	5,010	+ 2,266	25	94,537	+ 42,071
Nelson Corporation.....	Mar. 30	345	240	+ 15	52	10,802	+ 562
N'castle-on-Tyne Corp.	April 18	4,455	5,988	+ 1,533	3	14,607	+ 2,265
Newport (Mon.) Corp....	,, 12	738	1,022	+ 284	3	2,406	+ 324
New St. Helens & Dist...	,, 15	714	1,161	+ 447	42	34,019	+ 3,124
Northampton Corp	,, 18	515	754	+ 239	2½	1,536	+ 233
Nottingham Corp.	,, 16	3,190	4,018	+ 828	2½	8,441	+ 766
Oldham Corporation ...	,, 19	2,094	2.831	+ 737	4	8,992	+ 1,106
Portsmouth Corp.	,, 18	1,847	3 130	+ 1,283	...	...	...
Preston Corporation ...	,, 15	855	1.055	+ 200	3	2,711	+ 267
Provincial	,, 18	1,610	2,718	+ 1,103	29	50,004	+ 3,202
Reading Corporation ...	,, 16	634	864	+ 230	2	1.757	+ 331
Rochdale Corporation	,, 18	1,518	1,892	+ 374	3	4,859	+ 815
Rotherham Corp.	,, 22	930	913	— 17	3	3,074	+ 294
Salford Corporation ...	,, 20	4,974	5,309	+ 331	3	15.310	+ 1,332
Sheffield Corporation...	,, 19	7,315	8 265	+ 950	4	27,960	+ 2,384
Southampton Corp.	,, 15	1,132	1,549	+ 417	2	2,981	+ 373
Southend-on-Sea Corp.	,, 15	618	1 501	+ 883	3	2,404	+ 998
South Met. Trys.	,, 17	722	1,548	+ 826	16	15,875	+ 4,688
South Shields Corp.	,, 18	630	849	+ 219	2½	2,120	+ 567
Sunderland Corp.	,, 19	1,318	1,613	+ 295	3	4,128	+ 463
Sunderland District ...	,, 15	511	802	+ 291	24	13.781	+ 1,338
Swindon Corporation ...	,, 15	149	226	+ 78	2	421	+ 114
Trys. (M.E.T.) 'Buses	,, 18	2 743	10.663	+ 7,894	16	130.511	...
TynesideTrys.&Tmrds	,, 15	465	1,133	+ 671	15	7,832	+ 551
Wallasey Corporation	,, 18	1,079	1,534	+ 455	2½	3.484	+ 557
Walsall Corporation ...	,, 18	751	867	+ 116	16	9,777	+ 357
Walthamstow U.D.C....	,, 15	673	1,076	+ 403	3	2,385	+ 735
Warrington Corp	Mar. 26	476	428	— 48	51	23,929	+ 336
West Ham Corporation	April 16	2,630	3 452	+ 822	2	7,038	+ 1,157
Wigan Corporation.....	,, 16	1,342	1.837	+ 495	1	3,812	+ 513
Wolverhampton Corp	,, 23	1,036	1,099	+ 63	4	3,708	+ 579
Yorkshire (W. Riding)	,, 19	1,293	1.746	+ 453	16	22,921	+ 1,589

* From such of the services as were working both last year and this year the receipts show an increase of £16,636 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

Name.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London.....	April 18	£5,322	£4,334	— £988	16	£81,580	— £3,755
City and South London	,, 18	3,131	2.636	— 495	16	44,769	— 3,440
Liverpool Overhead.....	,, 19	1,631	1,840	+ 209	16	26,357	+ 916
London Electric.....	,, 18	14.875	14,440	— 435	16	232,605	+ 995
Mersey	,, 18	2.300	2.403	+ 103	16	36,319	+ 125
Metropolitan	,, 19	16.873	18,660	+ 1,787	16	285,915	+ 25,463
Metropolitan District..	,, 18	13.579	13,104	— 475	16	211.197	+ 103

The Tramway & Railway World can be obtained, post free, at the following rates:—

For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
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Tel. No.: 2948 Gerrard.
Telegraphic Address: "Tramigro," London.

AMBERLEY HOUSE, NORFOLK ST., W.C.

TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, April 24.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	+ ½	69½ — 71½
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	...	4⅝ — 4⅞
5	Do. 5½% Cum. 2nd Pref.	...	4⅜ — 4⅝
100	Do. 4% Deb. Stk. Red.	...	93½ — 94½
100	Do. 4½% Deb. Stk. Red.	+ 1½	98¾ — 101½
100	Do. 5% Deb. Stk. Red.	...	96½ — 98½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 — 106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅞ — 1
1	Do. 5% Cum. Pref.	...	½ — ¾
1	Do. 4½% 1st. Mort. Deb. Stock, Red.	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	...	85 — 87
10	Blackpool and Fleetwood Tramroad Co.	...	14 — 15
	Bombay Elec. Supply and Trams. Co., Ord.	+ ½	14 — 15
10	Do. do. 6% Cum. Pref	...	10¼ — 11½
100	Do. do. 4½% Db. Stk Rd.	...	94½ — 96½
$100	Brazilian Traction Light and Power Co. Lim.	— 5	78 — 80
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	...	7½ — 8
5	Do. do. 5% Cum. Pref	...	4⅞ — 5⅛
100	Do. do. 4½% 1st Deb Stock, Red.	...	98 —101
10	Bristol Tramways and Carriage Co.	...	6¾ — 7
10	Do. do. 4% Cum. Pref.	...	6⅞ — 7⅛
100	Do. do. 4% Deb. Stock	...	100 —103
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Ry. Co., Lim., Def. Ord. Stck.	...	117 —121
100	Do. Pref. Ord. Stock	...	105 —109
100	Do. 5% Cum. Perpetual Pref. Stock	...	102 —105
100	Do. 4½% 1st Mort. Debs.	...	93 — 93 xd
40	Do. 4½% Vancouver Power Debs.	...	94 — 98
100	Do. 4½% Perpetual Cons. Deb. Stk.	— 1	93½ — 95½
100	British Elec. Traction Co., Lim., 6% Cum. Pref.	..	89 — 92
100	Do. 7% Non-Cum. Pref.	...	56 — 59
10	Do. 6% Pref. Ord. Non-Cum.	...	15½ — 17½
100	Do. Deferred Ord. Stock	...	6½ — 8½
100	Do. 5% Perpetual Debenture Stock	...	93 — 95
100	Do. 4½% Second Debenture Stock, Rec	...	79 — 83
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	73 — 78
100	Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb	...	100 —102
5	Calcutta Tramways Co., Limited. Ord.	...	7 — 7½
	Do do. 5% Cum. Pref.	...	5 — 5¼
100	Do. do. 4½% 1st Deb. Stock, Red.	...	97 —100
1	Cape Electric Tramways, Ld.,	...	⅜ — ½
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	3 — 3½
100	Do. 5% Debs., Red.	...	89 — 91
5	City of Buenos Ayres Trams. Co. (1904), Lim.	...	5¼ — 5½
100	Do. 4% Debenture Stock Red, 1965	...	91 — 96
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.	...	89 — 93
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	...	93 — 96
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	— 6⅞
10	Dublin United Trams. Co. (1896) Lim. Ord.	— ⅜	— 10⅞
10	Do. do. 6% Pref.	— ⅛	— 12½
100	Do. do. "A" Red.	...	— 80¾
100	Do. do. Deb. Stock "B" Red.	...	— 79
10	Gateshead & Dist Trys. Co., Ord.	...	8½ — 9
10/-	Hastings & Dist. Electric Trams. Co., Ld., Ord.	...	⅜ — ½
1	Do. do. 6% Cum. Pref.	...	½ — ¾
100	Do. do 4½% Deb. Stk. Red.	...	65 — 70
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	93½ — 97½
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)	...	86 — 90
10	Imperial Tramways, Ord.	...	3 — 3½
10	Do. do. 6% Cum. Pref.	...	6½ — 6¾
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.	...	2 — 2¼
100	Do. 4% Debenture Stock	...	73 — 78
1	Kalgoorlie Elec. Trams., Ltd.	...	0 — 1/16
100	Do. do. 5% "A" Deb. Stk.	...	85 — 90
100	Do. do. 6% "B" do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.	— 1/32	¾ — 1
10	Lanarkshire Tramways Co.	...	9¾ — 10¼
100	Lancashire United Tramways. 5% Prior Lien Deb.	...	87 — 89
1	Lisbon Electric Trams., Lim., Ord.	...	1½ — 1⅝
1	Do. 6% Cum. Pref.	...	1⅜ — 1 1/16
100	Do. 5% Mort. Debs.	...	95 —100
1	London and Suburban Trac. Co., Lim., Ord.	...	3/32 — 5/32
100	London General Omnibus Company, Limited, 4½% Deb.	+ ½	98¾ —100½
100	Do. do. 5% Cum. Inc. Deb. Stk. Red.	...	89 — 92
100	London United Trms.(1901) Ltd., 4½% 1st Mt. Deb. Stk. Red	— 2	56 — 60
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref.	...	4⅞ — 5¼
5	Do. do. 5% Deb. Stk., Red.	...	101 —103
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	— 1	78 — 81
$100	Manila Electric R.R. and Lighting Corp. Capital Stk	...	107 —110
$1,000	Do. do. 5% Bds.	...	99¼ —100¼
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	1/16 — 1/8
100	Metropolitan Elec. Trms. Ltd. 4½% Deb. Stock, Red.	...	88 — 91
100	Do. 5% Deb. Stock, Red.	...	85½ — 88½
100	Mexico Tramways Co., Common Stock	—10	60 — 65
500	Do. Gen. Con. 1st Mort. Gld. Bonds	— 7½	70 — 75
100	Do. 6% 50-yr. Mort. Bonds	— 7	70 — 75
...	Michigan United Railways 5% 1st Mort. Gld. Bonds	...	91½ — 93½
100	Montreal Street Railway, Sterling 4½% Debs. (1922)	...	98 —100
100	Do. 4½% Sterling Debs, (1922)	...	99 —101
1	National Steam Car Co. Ltd.	— 1/8	3/32 — 5/32
10	Oldham—Ashton and Hyde Elec. Ord.	...	6 — 6¼
10	Do. do. 5% Cum. Pref.	...	5⅞ — 6⅛
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	3¾ — 4¼
5	Do. do. 6% Cum. Pref.	...	4 — 4½
1	Perth (W.A.) Elec. Trams., Ld., Ord.	...	—
1	Potteries Electric Traction Co., Ltd., Ord.	...	¾ — ⅞
1	Do. 5% Cum. Pref.	...	1/16 — 1/32
130	Do. 4½% Debenture Stock, Red.	...	84 — 87
1	Provincial Tramways, Lim., Ord.	...	1/32 — 1/32
10	Do. 5% 1st Deb. Stock	...	95 — 98
...	Puebla Tramway, Light & Power Co., Prior Lien 5%..	— 2	75 — 80
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.	...	5 — 5½
100	Do. do. 4½% 1st Mt. Db. Stk	...	95 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	87 — 89
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	— 1	96 — 98
100	Do. do. 5% 50-yr. Mort. Gold Bonds	— ½	89 — 91
100	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	— 1½	96 —100
$500	Do. 5% 1st Mort. Debs., Red., 1929	...	96 — 99
10	Shanghai Elec. Construction Co.	...	13½ — 13¾
100	Singapore Elec. Tramways Lim., 5% Debs. Red	...	88 — 93
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref.	...	⅝ — ¾
100	Do. do. 4% Deb. Stk.	...	66 — 70
...	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	95 — 97
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	— 1	97 — 99
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	83 — 85
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	90 — 92
5	United Elec. Tramways of Monte Video, Ord.	...	4⅝ — 5⅛
5	Do. do. 6% Cum. Pref.	...	4⅞ — 5⅛
100	Do. do. 5% 1st Deb. Stk. Red.	...	95 — 98
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	93½ — 95½
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	1/16 — 1/8
5	Do. do. 6% Cum. Pref.	+ ⅛	4¾ — 4⅞
100	Do. do. 4½% 1st Deb. Stock. Red.	...	83 — 86

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF DEVONPORT.

The Devonport Corporation Electricity Committee invites tenders for the supply of Cables, Wires, and Meters for a period of twelve months ending June 30, 1915.

Particulars and form of tender may be obtained on application to J. W. Spark, Borough Electrical Engineer, Newport Street, East Stonehouse, Devon.

Tenders must be delivered, sealed and endorsed "Tender for Cables, Wires, and Meters," on or before noon May 12, 1914.

R. J. FITTALL,
Town Clerk.

Municipal Offices, Devonport,
April 27, 1914.

MANCHESTER CORPORATION TRAMWAYS.

The Tramways Committee of the Manchester Corporation are prepared to receive tenders for the supply and delivery of Steel Girder Tramway Rails. Specifications and forms of tender may be obtained on application to Mr. J. M. McElroy, General Manager, Corporation Tramways, 55, Piccadilly, Manchester, on deposit of £1 1s., which will not be returned except on receipt of a *bonâ-fide* tender. Tenders are to be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, endorsed "Tender for Rails," and must be received not later than 10 a.m. on Tuesday, May 19, 1914.

The Committee do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

55, Piccadilly, Manchester,
May 2, 1914.

MADRAS AND SOUTHERN MAHRATTA RAILWAY COMPANY (LIMITED).

The Directors are prepared to receive tenders for :—

(1) About 358 Tons Steel Rails,
(2) About 19¼ Tons Steel Fishplates,

in accordance with the specifications, which may be seen at the offices of the Company. The charge for specification No. 1 is one guinea, and for No. 2, half-a-guinea, which will not be returned.

Tenders must be sent in, addressed to the Secretary, not later than 2 p.m. on Tuesday, May 12, 1914, marked "Tender for Rails," or as the case may be.

The Directors do not bind themselves to accept the lowest or any tender.

H. BONHAM-CARTER,
Secretary.

Company's Offices :
91, York Street, Westminster, S.W.,
April 27, 1914.

THE EGYPTIAN DELTA LIGHT RAILWAYS, LIMITED.

The Directors are prepared to receive tenders for the supply of Steel Coach Screws.

Specifications and forms of tender can be obtained at the Company's Offices, 210, Gresham House, Old Broad Street, London, E.C., on and after May 1, 1914.

For each specification a fee of 10s. 6d. will be charged, which will not be returned. Tenders to be submitted not later than noon on May 15, 1914. The Directors do not bind themselves to accept the lowest or any tender.

By order of the Board,
F. J. HORNE,
Secretary.

ILKESTON CORPORATION.

The Tramways Committee invite tenders for the supply of 23 Uniforms, Overcoats, and Caps.

Forms of contract, specification, and tender may be obtained from the undersigned on payment of a fee of 5s. (five shillings), which amount will be refunded on receipt of a *bonâ-fide* tender.

Tenders to be delivered at the Tramway Offices not later than May 14.

L. C. F. BELLAMY,
General Manager.

Tramways and Electricity Department,
Park Road, Ilkeston.

COUNTY BOROUGH OF WEST HAM.

TO ELECTRICAL CONTRACTORS, TRAMCAR BUILDERS, AND OTHERS.

The Council hereby invite tenders for :—

15 Double-Deck Bogie Electric Tramcars, and
1 Four-Wheel Single-Truck Double-Deck Electric Tramcar.

Specification, form of tender, and further particulars may be obtained from Mr. J. S. D. Moffet, Assoc.M.Inst.C.E., M.I.Mech.E., Tramways Manager, Greengate Street, Plaistow, E., on and after Monday, April 27, 1914, on the deposit of a £5 Bank of England note, which will be returned on receipt of a *bonâ-fide* tender.

Tenders, endorsed "Tender for Tramcars," to be delivered by registered post to my office not later than 10 o'clock a.m. on Saturday, May 16, 1914.

The Council do not bind themselves to accept the lowest or any tender.

The contractor will be required to enter into a bond, with two sureties, for the due performance of the contract, and no work will be ordered under the contract until such bond has been duly executed.

The contractor whose tender is accepted and with whom a contract is entered into, will be required to pay all workmen employed by him in or about the contract such rates of pay, and observe such hours of labour, as are embodied in the schedule, which will be part of the contract. In the event of any breach of such agreement the Council will enforce the penalty clause in its entirety.

A tender will not be accepted unless it is stated by the contractor in the tender, and proved to the satisfaction of the Council, that the contractor, at the date of the tender, pays to the whole of his workmen such rates of wages and observes such hours of labour as are recognised by the workmen's trade unions in the several localities where his work is done. If, after the contract is signed, it shall be proved that the said statements of the contractor in the tender are contrary to the fact, the Council shall be entitled to rescind the contract, or at their option to recover from the contractor as liquidated damages, and not as a penalty, the sum of £50.

By order of the Council,
H. W. GREAVES,
Town Clerk.

Town Hall, Stratford, E.,
April 23, 1914.

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CITY OF YORK.

TENDERS FOR FEEDER CABLES.

Tenders are invited for the supply, delivery, and laying underground of High-tension Three-phase Feeder Cables and Low-tension Direct Current Cables.

Specifications and forms of tender may be had on application from the undersigned.

Tenders are to be delivered in sealed envelopes endorsed "Tender for Cables," not later than 9 a.m. on May 12, 1914.

J. W. Hame,
Engineer and Manager.

Electricity Offices, Clifford Street, York.

POSITION VACANT.

CORPORATION OF GREENOCK.

BURGH ELECTRICAL ENGINEER.

The Corporation are prepared to receive applications for the position of Burgh Electrical Engineer. Applicants must have had experience in the management of electrical undertakings with high and low tension system of supply, and be capable of carrying out all extensions. The successful applicant will be required to give the whole of his time to the duties of the office. Salary to commence £450 per annum. Canvassing will be a disqualification. Applications, with copies of four recent testimonials, to be lodged, not later than 10 a.m., on Monday, May 11, with Colin MacCulloch, Town Clerk, Municipal Buildings, Greenock.

Greenock, April 28, 1914.

POSITION WANTED.

ENGINEER.

With practical and commercial experience, desires appointment. Several years' experience in Electric Traction work in all details from construction to running. Thoroughly accustomed to management and control of men. Ten years general manager. Highest testimonials. Box 77, The Tramway and Railway World, Amberley House, Norfolk Street, London, W.C.

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THE TRAMWAY & RAILWAY WORLD,
WITH MOTOR TRAFFIC SECTION.
Complete with Title-Page and Index.
VOL. XXXIII., JANUARY—JUNE, 1913
VOL. XXXIV., JULY —DECEMBER, 1913
(Price 10 Shillings each)
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WIRES and CABLES.
BITUMEN CABLES.
TRAMCAR HEATERS.
TRAMCAR METERS.
MEASURING INSTRUMENTS.
WATERTIGHT FITTINGS FOR CAR SHEDS.
ENCLOSED (Indicating) FUSES (to N.E. Code or English Standard).
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THE SANITARY
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WOOD PAVING
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for finishes of great durability and brilliant lasting lustre.
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LONDON,
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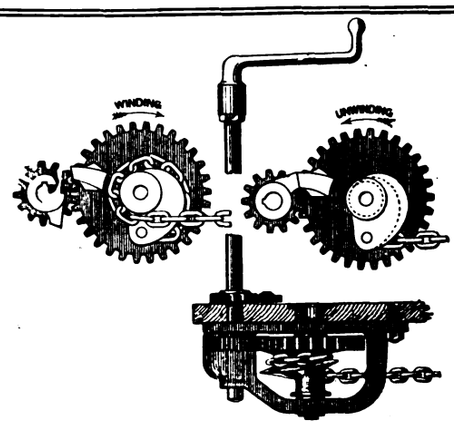

The "Peacock" IMPROVED Brake
(PATENT).
Note the simplicity of the Radial Contact pieces which render this the quickest of all geared hand brakes by
(1) Preventing the drum from over-running on release;
(2) Stopping the drum always at the point from which recovery of chain is most rapid;
(3) Eliminating all idle turning of the handle.
THE "PEACOCK" BRAKE CO., 27, CLEMENTS LANE, LONDON, E.C.

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THE
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SATURDAY, MAY 2, 1914.

THE "OCEAN"

ACCIDENT AND GUARANTEE CORPORATION, LTD.,

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PREMIER INSURER OF TRAMWAYS

HEAD OFFICE:

MOORGATE STREET, LONDON, E.C.

THE STRANGE CASE OF STOKE-ON-TRENT.

No more extraordinary instance of unfair and short-sighted policy on the part of a Corporation towards a tramway company has, perhaps, ever been recorded than that which has been adopted by Stoke-on-Trent. The facts do not appear to be disputed, and they constitute a case of grave injustice. The Potteries Electric Traction Company see in front of them the possible termination of their concession in three years' time. When that period arrives their undertaking can be acquired by the local authority under the provisions of the Tramways Act. Negotiations are in progress for the purpose of postponing the purchase and leaving the company in possession of the undertaking for a further period. At the same time the Corporation have been making complaints that the company's cars are overcrowded. To remove that trouble the company would have to spend a great deal of money in doubling tracks and in other improvements so as to allow of a more frequent service of cars being run. Obviously the company cannot launch out in this way unless they get a material extension of their concession. Pending a settlement of the matter, the company decided to relieve the pressure during the busy hours by running motor omnibuses in addition to their tramcars. They accordingly applied to the Corporation for licences for omnibuses, but the Watch Committee of the Corporation delayed decision of the application. In order to remove the congestion as soon as possible, and doubtless believing that in the circumstances the licences would certainly be granted, the company began running the omnibuses. Their reward for this alacrity to serve the needs of the public was that they were summoned and fined for plying for hire by means of omnibuses which were not licensed. A legal question arose as to whether the omnibuses did ply for hire, as fares were not taken in them; the passengers had to buy their tickets from offices or shops along the route. The Stipendiary Magistrate held that there had been plying for hire. We now come to the most remarkable part of the story. The prosecution referred to took place in the beginning of April. Yet at the end of the month the local authority have not yet granted the company licences for the omnibuses, and they now state that they will not do so unless the company contribute to the cost of road maintenance in respect of the running of the omnibuses. In view of the road maintenance for which the company are liable in respect of the tramways and of the rates payable on the tracks, the attitude of the Corporation *per se* cannot be called generous. But this attitude evidently is not enough. The Corporation have now actually granted thirty licences to an outside company, of which something has been heard before, namely Greater Omnibus Services, Ltd., and this company a few days ago began running their vehicles in competition with the tramcars. If a local authority allow the tramways to be worked by a company, the local authority ought to deal fairly by that company, and give them equitable protection. From the ratepayers' point of view a tramway undertaking is one of the best things that can exist in a town, as it contributes largely to the rates and bears a heavy share of the maintenance of the streets, which at the same time it does not wear. Paying these heavy contributions, it should not be exposed on a whim to free-lance omnibus competition. Otherwise, tramways all over the country—even municipal tramways—may find themselves subject to unfair competition, and the results which are a crying evil in London may be experienced elsewhere. It is, of course, true that municipal tramways have less to fear in this direction than company-owned tramways, but if the principle is admitted in one case it may be difficult to prevent its application in the other. The negotiations for the extension of the Potteries Electric Traction Company's concession are still pending, but it seems to us doubtful whether, even if the company get a substantial extension, they will undertake large further capital expenditure for track doubling and so forth, unless they are assured against competition from outsiders.

THE PREPAYMENT CARS AT LEICESTER.

In view of the special circumstances attached to the opposition shown by some members of the Corporation to the working of the payment on entry cars at Leicester, the Tramway Committee will have good grounds for disregarding the decision arrived at last Tuesday, instructing them not to continue the use of the system. There are a number of reasons in favour of continuing the use of the cars, as was recommended by the Committee. It cannot be urged that a majority of two, by which the opponents carried their amendment, is sufficient to justify the abandonment of the experiment that has been successfully carried out during the past thirteen months on the Narborough Road route. The statements as to alleged unpopularity do not tally with the result of the plebiscite of the district taken by the Committee. It may be recalled that in America, where the system is now on the way to becoming universal, its introduction was attended with rioting in one city. In this country the P.A.Y.E. cars are working successfully at Gateshead and Aberdeen, as well as at Leicester, and at the first and second mentioned places there has been no suggestion of unpopularity. In Leicester the opposition appears to have been made a party matter, and outside the Council chamber the opponents

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have gone so far as to assert that the chairman and vice-chairman of the Tramway Committee have been guided by financial motives. The debate last Tuesday, indeed, terminated abruptly by Alderman Flint refusing to reply to statements advanced by a member whom he alleged had accused him of making misleading statements. Enough evidence of the successful working was adduced in the paper which Alderman Flint contributed at the Conference of the Municipal Tramways Association last year to warrant the continued use of the cars. One notable point in his paper related to the almost complete disappearance of boarding and alighting accidents, whereas on the other cars 449 persons received injuries through such mishaps. At the Municipal Tramways Conference Alderman Flint was unable to say anything on the financial aspect of the cars, but on Tuesday last he stated that while the average receipt per car mile for the whole of the tramway system was 8½d., on the Narborough Road route it was 10.43d. In addition to pointing to the better collection of fares, he was able to state that now all reasonable grounds of complaint have been remedied there is increased comfort to passengers and a more humane system for the conductors. If further evidence of the success of prepayment of fares in properly equipped cars is required, it is to be found in the report published in our issue of December 11 last from the general manager of the Aberdeen Corporation tramways on the working of eleven such cars in that city. In twenty-one weeks these cars secured a total increase in receipts of £487, which was attributed to the conductors being able to collect every fare. Here also the manager stated that during the preceding year 309 accidents occurred on the other cars, the majority taking place while the conductors were collecting fares. These accidents, Mr. Pilcher added, were impossible with the P.A.Y.E. cars. While admitting that these cars take a slightly longer period to load, the Aberdeen manager showed that time is gained at every stopping place. This is achieved partly by the use of the front exit and also by the prompt starting signal which the conductor is able to give the motorman from his permanent position on the rear platform.

THE P.A.Y.E. CARS AT LEICESTER.

Report was made to Leicester Council on April 28 by the Tramways Committee that they had investigated all objections which have been made to the pay-as-you-enter cars, and had had certain alterations made to meet reasonable grounds of complaint. They had taken means to ascertain the feeling of the public using the tramways in the district of the borough in which the pay-as-you-enter cars have been on trial for more than twelve months, and were satisfied that there was a general feeling in favour of the system and a desire for its continuance. The committee were of opinion, after the experiment which had been carried out, that the "pay-as-you-enter" system was capable of very successful operation on the Leicester tramway, and they recommended the Council to approve its continued use.

Alderman Flint, in moving the adoption of the report, said the royalty was only £20 per car. The average receipts per car mile on the Narborough Road route where these cars ran was 10.43d., whereas for the town the figures were 8½d. The members of the Tramways Committee were nearly unanimous in favour of the recommendation. The system had been tried in other towns, and where there had not been a deliberate attempt made to kill it—as he held a certain number of gentlemen set out to do in this case—the system had been extended.

Councillor Hawkes moved that the recommendation be referred back to the committee, with an instruction not to continue the use of the P.A.Y.E. system, and in the course of the discussion Alderman Barton, deputy chairman of the committee, said that from the beginning the question had been made a party one by the opposition. Councillor Wilford said the Narborough Road section was the most efficient. At first the conservative instinct in human nature rebelled against the system, but all that had melted away, especially seeing that legitimate complaints had been remedied. The amendment was adopted by 23 to 21. Two members did not vote.

PRIVATE BILL LEGISLATION.

Bristol Corporation.—This authority's Tramway Bill came before a Committee of the House of Lords on April 28, the Committee consisting of the Earl of Lytton (chairman), the Marquis of Linlithgow, Lords Fingall, Basing, and Channing. Mr. Balfour Browne and Mr. Lloyd opposed on behalf of the Tramway Company, and the Corporation were represented by the Hon. J. D. Fitzgerald and Mr. G. J. Talbot. The Council, Mr. Fitzgerald said, would have the option of purchasing the great bulk of the undertaking next year. Mr. Hamilton, manager of Leeds tramways, and Mr. J. F. C. Snell, an electrical engineer and formerly a tramway manager, had advised the Council that the option was a valuable one, which it would be advantageous to exercise. They therefore decided to apply for powers to work the tramways. Referring to the argument in the company's petition that it was impossible to carry on proper traffic facilities unless the tramways and the omnibuses were in the same hands, counsel contended that 92 per cent. of the passengers were carried on the tramcars. Alderman Pearson gave evidence in support of the Bill.—On the following day Mr. J. B. Hamilton gave evidence strongly supporting the application of the Corporation, believing there was no reason why they could not, in the event of purchase, operate the lines with every convenience to the citizens and with success from a financial point of view. It was absurd for the company to suggest that it would not be easy to make arrangements for through running between the portions of the tramways purchased and those which were not purchasable in 1915.—In cross-examination, he said he did not think the Bill would place the company in the hands of the Corporation. It would be possible to have a generating station for the outlying portions of the system not authorised for 1915, but it would be better to have some agreement, and he understood that the Corporation were going to offer arbitration to settle this and the question of through routes. —Mr. J. M. McElroy, general manager, Manchester Corporation tramways, said he did not know a case where a Corporation had been refused powers to work their tramways. In Manchester they got powers to work before they decided to purchase part of the tramways. Having got the powers, they subsequently decided to purchase and work the whole undertaking. They had leased the outside lines and found it to work satisfactorily. They carried passengers three miles for a penny, and workmen four miles a penny, and they had in twelve years devoted £815,000 to the relief of the rates. He saw no reason why Bristol should not make a success of the undertaking. There was no difficulty in arranging terms for dealing with what had been called the fag ends of the lines.—Mr. Lloyd, in addressing the committee on behalf of the company, said that no case had been made out in favour of the Bill. It was a Bill of an absolutely novel character, and on the evidence as it stood there was no such Bill which had been opposed before either House of Parliament that had passed. The need for the Bill was not mainly for the purpose of working the tramways, but to go to the company and say: "On what terms are you going to sell? Parliament has given us a whip which we may or may not use." That was not what Parliament had ever authorised. What Parliament had said was that when the Corporation either owned or had made up their mind to purchase, and in some cases they had given notice to purchase, it was only right and fair that the Corporation, if they desired to work, should have the ability. —Lord Lytton gave the decision of the committee as follows:— "The committtee have decided that the Bill will proceed, subject to the insertion by the promoters of a clause placing upon the Corporation the obligation to purchase the tramways marked red in the cartoon in respect of which they have an option to purchase in May of next year; also a clause binding the Corporation to purchase the outlying portions marked yellow on terms to be agreed with the company, or failing agreement, subject to arbitration." —In reply to Mr. Fitzgerald, the chairman said the committee meant that the portions marked yellow must be purchased at the same time. The proposed clauses were submitted to the committee yesterday.

Chesterfield Corporation.—On April 27 this Bill, which authorises additional tramways, was sent for second reading in the House of Lords.

London County Council.—The Tramways and Improvements Bill of the London County Council came before a Committee of the House of Commons on April 22. Mr. Pollack, K.C., stated that the most important proposal was for the construction of a single line around Trinity Square, Tower Hill, and a double line from Tower Hill, passing along Mansell Street to the existing junction at Aldgate and Whitechapel. The carrying out of this scheme would abolish a terminus which the police regarded as the most troublesome dead-end in London. He mentioned that the proposal was opposed by the Port of London and Trinity House authorities, who occupied offices in Trinity Square, because the quietude of the neighbourhood would be disturbed. Mr. Humphries (chief engineer), Mr. Hume (chairman of the Highways Committee), and Mr. A. L. C. Fell (chief officer of tramways) gave evidence. The chairman (Mr. E. Soames) intimated that the committee intended going to the spot to examine for themselves the question of congestion. Mr. Fell said that it was not proposed to run all the cars round the loop. Probably it would be about one third of the cars. The committee adjourned until Monday last, and on April 28 they passed the clause, but directed that the Council shall pave Trinity Square with wood. They suggested the abolition of Whitechapel hay market.

Newcastle Corporation.—The Standing Orders Committee of the House of Lords on April 27 allowed this tramway Bill to pro-

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ceed to its next stage. The consent of the Northumberland County Council to a small portion of the tramways has been obtained, and it will be produced before the Select Committee on the Bill.

MISCELLANEOUS NEWS AND NOTES.

Salford and All-Night Cars.—Trade unionists in Salford are petitioning for an all-night services of cars in two districts.

An Addition to London Night Services.—On April 22 an all-night service of cars was instituted from Waterloo and Blackfriars Bridges to Catford.

Island Platform on Lavatory Roof.—The railings above the lavatory in George Square, Halifax are to be removed, and the space converted into an island platform for tramway passengers.

London and North Western Suburban Electrification.—The Earl's Court to Willesden section of the electrified suburban system of the London and North Western Railway was opened yesterday (Friday).

Assistant Conductors.—The Home Office have issued an order sanctioning from May 1 the employment of assistants to conductors of tramcars in London. Licences will only be issued to such persons who are over 16 years of age.

Omnibuses for Aberdeen Suburban Tramways.—Several petrol-electric omnibuses are about to be placed in service by the Tramways Company between Bieldside and Culter and Aberdeen and Dyce. Tours are also to be made to neighbouring places of interest.

Utilisation of Tramway Surpluses.—The new Provisional Order which Aberdeen Council have applied for will enable the Corporation to utilise the surplus fund of the tramway undertaking for the improvement of the city. Councillor J. Thomson intends to propose that a sum of £5,000 be devoted to the extension of the promenade.

Mirrors on Berlin Tramcars.—On the tramcars in Berlin mirrors have been affixed to the side of the cars at the height of a person's head when the passenger is standing on the lower step before alighting. It is hoped by this means to reduce the number of accidents caused by passengers neglecting to look out for overtaking traffic.

Effect of a Bonus at Yarmouth.—For the half-year ended March 31 last the motormen and conductors have received a bonus of 30s. each. Councillor Campling, chairman of the Tramways Committee, states that since the bonus system was introduced there have been fewer complaints of the men being inattentive, and he believes it has been an incentive to them to look after the traffic.

Proposed Joint Working of Barking Tramways.—Barking Council having proposed to lease their tramway from the Broadway to the boundary of East Ham, a proposal has been made by the inter-running authorities—London County Council and West Ham and East Ham Councils—that Barking Council should allow them to work the line for three months in order to ascertain its earning value under such condition.

Mr. McElroy's Report on Passenger Transportation.—The report of Mr. J. M. McElroy, general manager of Manchester Corporation tramways, which was summarised in our issue of April 9, has attracted much attention. It will be of interest to many of our readers, no doubt, to know that there is a limited supply of the report, and that copies can at present be obtained on application at a charge of five shillings.

A Liverpool Record.—A new traffic record was made by the tramways for the four weeks ended April 18. This period included Grand National day, Good Friday, and Easter Monday, the receipts showing an increase over 1913 of £3,480 from £50,174 to £53,654; passengers of 688,406 from 10,682,664 to 11,371,070; and mileage of 56,028 from 1,028,277 to 1,084,305. The Good Friday receipts increased by £239, and Easter Monday by £163.

Damages Awarded to a Conductor.—In the Dublin Sheriff's Court on April 15, a jury awarded a Belfast tramcar conductor £35 damages. The defendant, it was stated, had written to the tramways manager alleging that plaintiff demanded fares a second time, and on being refused he stopped the car, ordered defendant to leave, and used insulting and abusive language so strong that to stop his tongue he paid fares a second time. A further allegation was that plaintiff carried a young lady and never asked for any fare.

New Plant at Rotherham.—An application by the Corporation for sanction to borrow £10,956 for additional plant and an extension of the electricity works was the subject of a Local Government Board inquiry on April 29. Mr. E. Cross, tramways manager and electrical engineer, estimated that within three years, owing to the price of coal and the popularity of electric driving in local industries, the undertaking would be required to supply ten million units per annum, or more than twice the quantity supplied last year.

The Lunken Company, of 35, Great Dover Street, London, S.E., have issued an illustrated pamphlet describing their power meters, or integrating indicators. The apparatus, which they describe automatically indicates and, it is claimed, measures the power of an engine more accurately and reliably than can be done by any other means. There are two patterns—one intended as a permanent fixture to the engine, giving the exact daily record of the energy expended, and the other is intended as a test indicator.

Belfast Tramways and the Political Situation.—In his yearly report Mr. A. Nance, the manager of the Corporation tramways, says:—"In my opinion no estimate made for the ensuing year is worth the paper it is written on, having regard to the uncertainties which lie before us; and as no statutory duty is placed upon me to make an estimate, I refrain from doing so. I am in a position, however, to say that the committee may firmly rely upon the whole-hearted and loyal operation of the undertaking by their staff, without exception, and that whatever happens the tramways will go on working, if worked they can be by human power."

Conductor's Successful Action.—At Colne on April 28, his Honour Judge Graham gave judgment for the plaintiff in an action brought against the Colne and Trawden Light Railway Company by J. E. Stephenson, an ex-conductor, for £2 14s. 6d., wages and alleged illegal deductions. Plaintiff stated that he lost 500 penny tickets, and the face value of them was deducted from his wages. The company's contention was that the money stopped was for cash shortages from July 1. In entering judgment for plaintiff with costs, his Honour said the law enacted that the employer must at the time of making a contract give a copy of it to the workman or a notice containing its terms. Plaintiff's conduct had been such that he might very properly have not allowed any costs.

Withdrawal of Dundee Railless Trolley Cars.—The Tramways Committee have decided to withdraw the railless trolley cars from Clepington Road. Councillor G. A. Johnston, chairman of the committee, stated on April 20 that since the decision of the Tramways Committee to come to the rescue of the Works Department to relieve the rates of half of the expenditure of £6,000 proposed to be made on the road, he concluded that it would be better to withdraw the cars altogether. It seemed to him to be an extraordinary position that they could not get suitable roads for that and other traffic, as was done in other towns. At a subsequent meeting of the Works Committee the chairman, Councillor Spence, said it would not be worth while discussing what should be done with the road until the Corporation had considered the resolve of the Tramways Committee to withdraw the cars.

Opposition to Assistant Conductors.—Union tramway employees are objecting to the proposal to employ youths as assistants to the conductors of the London County Council cars, a step which has been adopted for years in busy provincial towns. In the House of Commons on April 28 the Home Secretary, in reply to Mr. Rowlands (Dartford), said that the London County Council had represented to the Commissioner of Police that the employment of lads to assist conductors might conduce to the safety of traffic, and he had accordingly authorised the employment of boys over sixteen years of age as assistant conductors. The experiment would be tried on one or two routes. If successful it would be extended, but in no case would the boys take the places of conductors. At a meeting of tramway employees, held at Camberwell on April 29, the men pledged themselves to resist the introduction of boys, and called upon the executive committee of their union to take steps to secure the rescission of the order.

Board of Trade Report on the Rochdale Accident.—Colonel Druitt's report on the running away of a tramcar on the John Street incline on February 14 was issued by the Board of Trade on April 29. Colonel Druitt states that the motorman did not try the magnetic track brake until he was on the steep gradient, and also did not carry out the instructions to put the controller handle to the last braking notch. The probable cause of the car getting out of control was that, with the controller handle only on the third braking notch, the car acquired quickly a high speed before any braking effect could take place, and when the handle was put to the last notch the wheels of the car became locked and skidded to the bottom of John Street. The inspector does not think that the sander afforded a sufficient supply. This has been brought to the notice of the manager, with the result that on a number of the cars the sanders have been converted from an intermittent to a continuous type with quite satisfactory results. Colonel Druitt deprecates the practice of using the magnetic brake only for emergency purposes, as this prevents the discovery of defects.

Danger of Cast Iron Valves on Superheated Boilers.—The Board of Trade have issued a report prepared by their inspector on the explosion from a boiler stop valve chest at Pinkston Tramway Power Station, Glasgow, on November 10, 1913. The explosion, by which no person was injured, was found to have been due to the long-continued action of superheated steam on the cast iron, causing disintegration and deterioration of the material of the valve chest, and it is added that a number of manufacturers have entirely ceased to use cast iron, when superheat is specified, not only in land installations, but also in connection with marine work, as they do not consider it reliable. As a result of the explosion, the three electric lighting stations under the control of the Glasgow Corporation were, in addition to the Pinkston Tramway Power Station, being entirely equipped with steel mountings on boilers and steam pipes, and it would seem, it is added, if superheating becomes common, or much higher boiler pressures are to be used in the future, that cast iron must be barred for boiler stop valves and in ranges of steam pipes, either as junction pieces or expansion glands.

Russian Tramway Developments.—Odessa Town Council have had plans prepared for the extension of the power station of the tramway system. The proposed extension embraces the installation of new turbines and boilers, equal to 3,500 kw. over and above three machines of 60 kw. The sub-station will be strengthened by four machines of 750 kw., in addition to the 11 machines of 3,000 kw. This extension has been authorised in view of the expected great extension of the tramway system in the near future. The committee, appointed two years ago, to plan an improved tramway service for Odessa have completed their work. The Central Station will be removed, and all the single line tramways will be doubled. The new lines will make 11 versts in all. Cars of more than one class will be run in the system; these will include second-class cars. A tramway is projected to run between Riga and Vsmorye. The distance between towns is about 27 versts, of which 10½ will be double line and the rest single line. The trains will consist of four axle carriages, with 45 seats, plus standing room for 10-16

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people. The cars will accommodate second and third-class passengers. It is intended that the trains shall run at the rate of 60 versts (40 miles) per hour. A contract has been signed between the concessionaire of the Warsaw-Mlotzin-Lomyanka Tramways and the Lodz Electrical Roads Company, who will construct that tramway. The Lodz company also have the concession for the construction of a tramway between Ozorkoff and Egerzha, through Lenchitz. The town of Perm has been authorised to obtain a loan of 3,500 roubles to enable it to construct tramways and execute other public works.

CONTRACTS AND ORDERS.

Daimler Company, Coventry, have received an order for six 2½-ton lorries for the British Petroleum Company.

West Ham Council have placed a contract for the supply of electrical conduits with Messrs. Gillespie and Beales.

British Thomson-Houston Company have been awarded the contract for supplying two 180 kw. generators for sub-stations at Leigh and Thorpe Bay, for £752.

Birmingham Council have accepted an offer from the City Electrical department to provide two electrical battery vehicles for the removal of street refuse at £550 each.

Portsmouth Tramways Committee have reported in favour of purchasing two 30 h.p. "X" type of chassis, for use as a tower wagon and lorry respectively, from the London General Omnibus Company.

Chas. Macintosh and Co., Limited, have received a contract from the London General Omnibus Company for tyres for 600 omnibuses operating on surfaces ranging from the smooth pavements of central London to the macadam roads of rural localities.

Stratford Co-operative Society are working a 2-ton Edison electric van. Charging is given at the West Ham Corporation electricity works. It is stated that the Society are considering the advisability of purchasing additional electric vehicles.

United Electric Car Company have received a contract to supply fourteen top covers for tramcars to Huddersfield Council. The company's tender for the supply of three toast-rack car bodies has been recommended for acceptance of Southport Council by the Tramways Committee.

Royal Ediswan Lamps.—The Edison and Swan United Electric Light Company, Limited, have received through a Dublin firm of contractors an order for over 2,300 Royal Ediswan drawn wire lamps for Maynooth College, which is at present changing over from carbon to metal lamps.

Simplex Rubber Company have received an extended contract from Southend Council for the maintenance of the rubber tyres of two motor vans in the highways and works department, at a charge of 1¾d. per mile run, the agreement to be subject to three months' notice on either side.

Omnibuses for Leicester.—The Corporation have accepted the tender of the Daimler Company, Limited, for three omnibus chassis at £550 each, and of Christopher Dodson, Limited, of London, for the bodies at £212 15s. each, the additional cost of tyres, accessories, spare parts, etc., being estimated at about £200 for each vehicle.

Dennis Brothers (1913) Limited, of Onslow Works, Guildford, have secured an order from Surrey County Council for three 5-ton tipping wagons for their roads department. A similar 5-ton tipping wagon is being supplied to the Hambledon Rural District Council. The vehicles are of an interesting and useful type, which has not hitherto been employed, perhaps, as extensively as it should be. Dennis Brothers inform us that they are receiving numerous orders for chars-à-bancs, and that there has been a substantial increase in their deliveries for the past three months, as compared with the corresponding period last year.

PERSONAL.

Mr. H. P. Stokes, electrical engineer and tramways manager to the Bexley Urban District Council, has had his salary increased by £100 per annum.

Chief Inspector Garrett, for eleven years with Lowestoft Corporation tramways, has been appointed inspector to the Erith Council tramway undertaking.

Mr. F. E. Pillar, accountant of the Carthagena and Herrerias Steam Tramways Company, has been appointed secretary, in place of Mr. R. J. Fennessy, resigned.

Mr. H. C. Adams, of Henry Adams and Son, consulting engineers, is included in the recent list of transfers to full membership of the Institution of Civil Engineers.

Mr. R. J. Fennessy, owing to ill-health, has resigned the position of secretary of the Carthagena and Herrerias Steam Tramways Company as from March 1. In view of his long and valuable services, the directors have granted him a retiring allowance of £200 a year.

Mr. W. Jenson, general manager of the Chatham and District Light Railway Company, while boarding a car at the front platform, on April 25, was knocked down by another car proceeding in the opposite direction. He was taken to hospital suffering from a severe scalp wound, a dislocated shoulder, and a broken wrist.

Mr. P. Bartley, a conductor on the Dublin United Tramways, is retiring on pension after 27 years' service, in order to take possession of a house and land from which his father was evicted. He owes his good fortune to the persistent work of Mr. J. P. Nannetti, M.P. Of his work on the cars he says that a conductor's life is not all roses. The persistent clanging of the bells and the noise upset one's nerves, and the anxiety about the time sheet was enough to break down any man. His feet, too, were worn out.

Mr. J. A. Panton, general manager and director of the National Rail and Tramway Appliances Company, Liverpool, has resigned his position as general manager, but remains a director of the company. Mr. Panton is proceeding on a visit to Canada, where he is interested in similar business.

Mr. H. J. Nisbett, engineer and manager of the Rhondda Tramways Company, will take up a similar appointment at Torquay during the second week in May. Mr. H. Holliday, the present engineer and manager, concluded his engagement at Torquay on April 30 to take over Mr. Nisbett's position at Porth.

Mr. Washington Hall has been presented by the members of the Potteries district of the British Electrical Friendly Society with an oak bureau in recognition of his services as secretary. The presentation was made by Mr. Cornwallis West at the annual dinner, at which Mr. W. Thom, general manager of the Potteries Electric Traction Company, presided.

Mr. W. H. Peake, timekeeper on the Blackpool Corporation tramways, on his retirement has been presented with a watch from the employees. Mr. C. I. Baker, traffic superintendent, mentioned that Mr. Peake had been connected with the Corporation for 19 years. Mr. F. Field, resident engineer, referred to Mr. Peake's devotion to duty. A gold brooch was handed to Mr. Peake for his wife.

Mr. W. G, Snell, the manager, and the staff of Perth Corporation tramways, received praise from Ex-Bailie Calderwood, the chairman of the Tramways Committee, at the employees' annual social gathering. The Corporation, he said, had every reason to be proud of the staff and their manager, who were ever anxious to make the best of their opportunities. He did not believe there was another system which had passed through the whole year with so small a claim against it, showing with what care all the departments were managed. In reply, Mr. Snell referred to the energetic way in which Mr. Calderwood had assisted him personally, and the department as a whole. There was not an employee present but had received a kindly word from him.

Mr. J. Kneeshaw, tramway traffic superintendent at Sydney, died on March 16. He had just entered upon six months' leave of absence prior to his retirement from the service.

FINANCIAL REPORTS AND MEETINGS.

Willans and Robinson, Limited.—The net profits for the year 1913 were £8,782, after payment of debenture interest. A dividend of 10 per cent. is recommended on the ordinary shares, and £1,678 will be carried forward.

Colombo Electric Tramways and Lighting Company, Limited.—Dividend of 10 per cent., free of tax, has been declared, for the year 1913, carrying forward £6,840. £20,000 has been transferred to general reserve and renewal fund.

Rangoon Electric Tramway and Supply Company.—After adding £12,500 to the renewals fund and £2,000 to the special reserve for cables, and providing for expenses of debenture issue, the net profits for 1913 were £25,924, and £751 was brought forward. A dividend of 6 per cent. is proposed on the ordinary shares, free of income-tax, carrying forward £1,055.

Tyre and Rubber Dividends.—The Parent Tyre Company have declared an interim dividend at the rate of 5 per cent. per annum on the preference shares for the six months ended February 28.—The Dunlop Rubber Company's directors have declared an interim dividend at the rate of 10 per cent. per annum on the ordinary shares for the six months ended February.

Babcock and Wilcox, Limited.—At the annual meeting of Babcock and Wilcox, Limited, on April 23, Mr. J. H. Rosenthal (the chairman) said that the net profits for the year, with the balance brought forward, amounted to £510,087. An interim dividend of 7 per cent. on the ordinary shares had been paid, and the directors recommend a further distribution of 9 per cent. They further proposed to place £150,000 to the reserve, and £10,000 to the staff pension funds, leaving £73,834 to be carried forward.

Sunderland District Tramways Company.—The report on the past year's trading states that after providing for interest on the prior lien bonds, and the first mortgage debentures, sinking fund instalment and balance of receivership expenses, and transferring a sum of £1,000 to reserve account for law costs, etc., there remains a net profit of £2,717. Of this amount the directors have decided to transfer £2,000 to reserve account, leaving £717 to be carried forward. Traffic receipts show an increase of £4,608. Sixteen new cars have been put into service.

Bury Corporation Tramways.—The working for the year ended March 31 last shows a profit of £9,124 on the Bury section. On the Radcliffe section, under the first agreement, there was a profit of £1,302, and under the second agreement there was a loss of £279, to which loss one moiety will be met by Radcliffe Urban Council, and the other moiety by the Corporation. £1,000 is to be carried to the insurance fund; £3,124 to the reserve and depreciation fund, which now stands at £27,486, and the balance of £5,000 to the credit of the borough rate.

Blackpool Tramways Profit.—The income of the Corporation tramways for the year ended March 31 was £84,797, compared with £74,166 the previous year. The gross profit was £41,310, compared with £34,484, and the disposable balance is £24,522, against £18,331 the previous year. £12,000 is to go to the relief of the rates, and the balance to the renewal fund. The passengers numbered 12,992,771, an increase of 1,671,623. The estimated revenue for the current year is £83,960, and the gross profit £38,860. The income for the electricity works was £44,997, compared with £40,333 the previous year. The net surplus is £7,463.

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ANGLO-ARGENTINE TRAMWAY COMPANY.

The thirtieth ordinary general meeting of the Anglo-Argentine Tramways Company, Limited, was held on April 28, at Winchester House, Old Broad Street, E.C., Mr. J. B. Concanon presiding. The Secretary (Mr. W. D. Dawes) having read the notice convening the meeting and the report of the auditors,

The Chairman said that since he addressed the shareholders this time last year they had had to deplore the passing away of three of their colleagues, and he was sure they would all desire to associate themselves with the directors in their deep sympathy with the bereaved families. Business in the Argentine during 1913 showed no improvement upon 1912, which was not a good year, but rather the contrary, and naturally the commerce of the city of Buenos Ayres suffered in consequence. It was all the more pleasant therefore to be able to congratulate them upon the continued progress made by the company. The total number of miles run, namely, 50,872,935, showed an increase of 6.51 per cent. over 1912, whilst the number of passengers carried, 342,140,422—increased by 25,880,325, or 8.18 per cent., and the total receipts were better by £208,382, or 7.56 per cent. The expenses showed an increase of £145,140, mainly under the head of wages consequent upon the additional mileage. Thanks to lower freight rates for coal and to continued economy in the consumption of current, there was an actual decrease in the cost of £5,348, as compared with 1912, although the cars ran 3,107,268 more miles. The expenditure included £347,650 spent upon overhead lines, cables, permanent way, rolling stock, and buildings, as well as £150,000 credited to the renewals fund. The latter fund was charged with £147,652 for renewals effected during the year. The net revenue account, including the balance £9,253 carried in from 1912, after providing the City Company's annuity, interest on debenture stocks, interest on temporary loans, dividends on both classes of preference shares, provision for sinking funds on the 4 per cent. and the 4½ per cent. debenture stocks, and the share capital, left a balance available for dividend on the ordinary shares of £232,795, an increase as compared with 1912 of £23,490. The interim dividend paid on the ordinary shares absorbed £100,000, and the directors now recommended a final dividend which would require £119,375, leaving a balance of £13,420 to be carried forward. The subway construction work was making rapid progress, and they hoped by August next to complete the extension of the first section. The subway lines in operation were giving satisfactory results. The owners of the ordinary share capital had taken up 150,000 new shares at £5 5s. net to the company, and the balance of the 5 per cent. debenture stock, £1,500,000, was issued in February last, the applications for which amounted to £2,482,600. That completed the issue of the authorised debenture stock. Upon the question of possible motor omnibus competition, to which he referred at their last annual meeting, they would be interested to hear that the Municipal Council had recently declined to grant any concessions therefor, upon the grounds that the tramways system was sufficient for the public needs, and that the narrow streets and the paving system would make their operation inapplicable. For the current year up to March 31, the gross receipts showed an increase of £20,814 over those of 1913. He moved "that the report and accounts for the year 1913 be received and adopted."

Mr. C. N. Sandford seconded the motion, which was carried unanimously.

The Chairman next proposed: "That £119,375 be paid as a final dividend on the ordinary shares for the year ended December 31, 1913, which, with the £100,000 paid as interim dividend, is equal to 6¾ per cent. on the total issued share capital of £3,250,000." He remarked that the dividend last year was at the rate of 8¼ per cent., but that was on £750,000 less capital. As a matter of fact, the dividend which they now declared was larger in amount than last year. Mr. G. A. Touche, M.P., seconded the motion, which was agreed to.

A vote of thanks was awarded to the chairman and members of the local committee, Mr. Pedriali (the general manger), and to the staff generally in Buenos Ayres and in London, for their services during the year. The chairman stated that shareholders who had visited Buenos Ayres would have some idea of the enormous ramifications of the tramway system, but they could not be aware of the interminable internal work that was necessary to carry on the business successfully.

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WEEKLY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended April 25, give total receipts of £237,842 or £12,715 more than in the corresponding week last year. The total length of track was 2,863 miles, or 24 more than for the corresponding week. Receipts were at the rate of £83 1s. 5d. per track mile, an increase of £3 15s. 6d. as compared with the corresponding week of last year.

THE BRITISH ELECTRICAL FEDERATION.

The traffic statement for the week ended April 24, 1914, shows that the receipts from tramways and railways amounted to £41,315, as compared with £40,068 in the corresponding week last year, and from omnibuses £15,512, as compared with £5,433, making a total of £56,827, as compared with £45,501. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year the receipts show an increase of £1,412 upon the week.

RAILWAYS OF THE UNITED KINGDOM.

The summary of the official traffic returns of the fifty principal railways of the United Kingdom for the week ended April 26 gives a total of £2,279,367, which was earned on 22,161 miles, being at the rate of £102 17s. 1d. per mile of line open. For the corresponding week of 1913 the receipts of the same lines amounted to £2,300,169, with 22,099 miles open, or £104 1s. 8d. per mile. There was thus a decrease of £20,802 in receipts, an increase of 62 in mileage, and a decrease of £1 4s. 7d. in receipts per mile. Thirty six of the returns distinguish between the receipts from passenger and goods traffic, and these show an increase of £64,747 (or £2 17s. 1d. per mile) in the passenger receipts, and a decrease of £85,593 (or £4 2s. 1d. per mile) in the receipts from goods traffic. The aggregate receipts of the fifty railways since the beginning of the year amounted to £36,484,314, in comparison with £36,820,887 last year, a decrease of £336,573.

COPPER AND ALUMINIUM MARKET.

May 1, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

	Friday, May 1.	Last week.	A Year Ago
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	64 0 0	63 0 0	68 0 0
,, ,, (three months)	64 5 0	63 0 0	68 0 0
Electrolytic Copper—bars or ingots ..	66 0 0	65 15 0	72 5 0
Aluminium—bars or ingots	83 0 0	83 0 0	91 10 0

COAL MARKET.

May 1, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

	Friday, May 1.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	s. d.
Best Admiralty Welsh (large)	24 3 ..	23 6 ..	26 3 ..	26 3
Best Seconds	23 6 ..	23 0 ..	25 6 ..	25 6
Ordinary Drys	20 9 ..	20 6 ..	24 0 ..	23 6
Best Washed Nuts	20 6 ..	20 6 ..	22 0 ..	..
Best Washed Peas	19 6 ..	19 6 ..	20 6 ..	..
Cardiff, f.o.b.—				
Best Admiralty (large) ..	19 9 ..	19 0 ..	21 9 ..	21 3
Best Seconds	19 0 ..	18 6 ..	21 0 ..	20 6
Ordinary Drys	16 3 ..	16 0 ..	19 6 ..	18 6
Best Washed Nuts	16 0 ..	16 0 ..	17 6 ..	..
Best Washed Peas	15 0 ..	15 0 ..	16 0 ..	..
Newcastle, f.o.b.—				
Best Steams	14 6 ..	14 0 ..	17 0 ..	15 0
Best Seconds	12 6 ..	13 0 ..	14 9 ..	14 9
Smalls	8 3 ..	8 0 ..	12 3 ..	9 6

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregate. Wks.	Aggregate. 1913-4.	Increase or Dec.
Anglo-Argentine	April 15	£54,424	£53,529	15	£854,829	+ £20,723
Auckland..... (28 days)	Mar. 13	19,566	23,332	37	182,422	+ 8,327
Ballarat and Bendigo	March	3,904	4,151	50	47,694	— 701
Brazilian St. Rly. Mlrs	March	46,496	54,582	34	423,040	+ 65,379
Brazilian Traction.....	April 25	91,496	90,623	17	1,609,569	+ 74,169
Brisbane	March	26,370	28,325	13	81 915	+ 7,875
British Columbia .....$	March	720,493	717,251	39	6,752,082	+ 849 161
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacroze..	March	46,227	45,222	39	402,125	+ 7,115
Calcutta.....Rs	April 25	63,006	65,808	16	11,51,756	+ 52 426
Cape Town	March	13,197	13,992	13	41,980	+ 2.693
Carthagena & Herreria	March	3,695	2,425	13	8,110	— 1,952
Cordoba	March	12,668	13,499	52	159,207	+ 13,593
East India	March	1,760	1,884	35	15,442	+ 640
Kalgoorlie.....	March	2,662	2,476	13	6,965	— 1,955
La Plata.....	March	5,771	5,178	13	15,240	— 1.048
Lima.....	Feb.	32,206	33,880	9	71,758	+ 5,423
Lisbon ..... Mlrs.	Jan.	...	156,175	4	156 175	...
Madras (14 days) Rs.	April 15	26,766	34,504	15	202,730	+ 17,559
Melbourne	Feb.	62,500	64,000	9	132 500	+ 3,000
Mexico .....$	March	606,411	617,654	13	1,750,819	+ 253,412
Montevideo.....	March	38,140	32,630	21	170,581	+ 855
Para	April 26	3,936	3,323	21	72.782	— 14,113
Port Elizabeth.....	March	3.943	4,535	13	12,575	+ 844
Puebla ..... $	March	62,500	67 300	13	195,400	+ 23,500
Shanghai .....$	April 22	20,652	24,400	16	384,600	+ 63.235
Singapore .....$	April 25	11,223	11,227	16	203,500	+ 9,615
Toronto .....$	March	772,491	836,328	13	2,461,966	+ 194.224
Winnipeg.....$	March	329,016	847,812	13	1,081,461	+ 80,516

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1913-4.	Increase or Dec.
Aberdeen Corporation..	April 22	£1,411	£1,704	+ £293	47	£74 839	+ £4,537
Accrington Corp.....	,, 22	546	581	+ 35	8	1,989	+ 258
Ayr Corporation	,, 25	257	328	+ 71	49	17,493	+ 2,568
Bath Electric	,, 22	768	1,012	+ 254	16	12,512	+ 855
Birkenhead Corp.	,, 26	1,187	1,247	+ 60	3½	4,791	+ 288
Birmingham Corp.	,, 25	11,754	12,260	+ 506	4	46,709	+ 3,700
Blackburn Corporation	,, 22	1,240	1,411	+ 171	4	5,954	+ 1,218
Blackpool Corporation	,, 23	623	955	+ 332	3½	5,421	+ 3,050
Bolton Corporation	,, 25	2,658	2,936	+ 278	4	11,422	+ 1,301
Bournemouth Corp.....	,, 29	1,899	2 044	+ 145	4	9,363	+ 1,662
Bradford Corporation...	,, 25	5,712	6,404	+ 692	4	24,519	+ 3,685
Brighton Corporation...	,, 26	921	1,042	+ 121	4	4,252	+ 911
Bristol	,, 24	7.314	8,447	+ 1.133	16½	126,727	+ 11,740
British Elec. Federatn.	,, 24	45,501	56,827	*	...	...	...
Burnley Corporation ...	,, 25	1,670	1,588	— 82	4	7,119	+ 660
Burton-on-Trent Corp.	,, 26	279	298	+ 19	4	1,149	+ 96
Bury Corporation.....	,, 26	1,291	1,408	+ 117	4	5,649	+ 685
Cardiff Corporation.....	,, 11	2,497	2,761	+ 264	1	4,585	+ 148
Chatham and District..	,, 23	888	933	+ 45	16	13,909	+ 391
Chesterfield Corp.	,, 16	241	341	+ 100	2	671	+ 114
Colne Corporation	,, 25	270	284	+ 14	...	...	...
Cork Electric.....	,, 23	469	542	+ 73	16	7,426	+ 113
Croydon Corporation ...	,, 17	1,467	2,336	+ 869	2	4,820	+ 1,049
Darlington Corporation	,, 25	246	248	+ 2	4	1,059	+ 148
Derby Corporation	,, 28	947	972	+ 25	3½	3,913	+ 457
Dover Corporation	,, 25	216	235	+ 19	4	927	+ 148
Dublin & Lucan	,, 24	131	152	+ 21	16	1,981	— 46
Dublin United	,, 24	5,822	6,088	+ 266	17	87,707	— 2,672
Dundee City	,, 22	1,271	1,353	+ 82	49	63,767	+ 4,191
East Ham Corporation	,, 25	1,028	1,030	+ 2	3½	3 909	+ 120
Exeter Corporation	,, 24	311	362	+ 51	4	1,325	+ 239
Gearless Motor 'Buses.	,, 25	...	514	...	17	7.639	...
Glasgow Corporation ...	,, 25	21,525	22,345	+ 820	47	966.620	+ 66,311
Glossop (U.Elec.Supply)	,, 25	130	129	— 1	17	2 070	— 10
Halifax Corporation ...	,, 21	1,883	2,282	+ 399	3	7,305	+ 1,483
Hastings & District.....	,, 22	887	1,114	+ 226	16	12,804	+ 204
Huddersfield Corp.	,, 25	2,084	2,240	+ 156	4	9,115	+ 1,549
Hull Corporation	,, 25	3,025	3,123	+ 98	4	11,872	+ 462
Ilford U.D.C.	,, 25	450	488	+ 38	3	1,996	+ 380
Ilkeston Corporation ...	,, 29	126	131	+ 5	5	672	+ 74
Ipswich Corporation ...	,, 25	413	424	+ 11	4	1,896	+ 327
Isle of Thanet	,, 25	450	512	+ 62	30	10,981	+ 1,068
Kilmarnock Corp.	,, 25	169	170	+ 1	49	8.562	+ 518
Lanarkshire	,, 23	1,806	2,259	+ 453	16	80,114	+ 4,122
Lancashire United	,, 22	1,434	1,700	+ 266	16	25,574	+ 3,398
Leeds City	,, 25	8,159	8,322	+ 163	4	32,115	+ 4,636
Leicester Corporation...	,, 25	2,763	2.917	+ 154	17	47,073	+ 3,033
Leith Corporation	,, 25	685	788	+ 103	49	34,713	+ 1,769
Leyton U.D.C.	Mar. 26	1,466	1,252	— 214	51¼	68,140	— 155
Liverpool Corporation..	April 25	12.449	13.169	+ 720	16½	211,894	+ 12,059
Llandudno & Colwyn B.	,, 24	215	264	+ 49	21	3,808	+ 91
London County Council	,, 22	42,670	43,452	+ 782	3	140.741	+ 10.138
London Gnl. Omnibus..	,, 25	65,970	69,386	+ 3,416	17	975,743	+ 30,712
London United	,, 24	6.264	6.627	+ 363	17	94.884	+ 4.877
Lowestoft Corporation	,, 25	130	178	+ 48	29	5,375	+ 726
Maidstone Corporation	,, 28	187	193	+ 6	4	864	+ 179
Manchester Corp.....	,, 25	17.538	18,089	+ 551	4	66,352	+ 5.734
Met. Elec. Trys.	,, 24	9.528	9,751	+ 223	17	144,542	+ 4,378
Nat. Steam Car Co., Ld.	,, 21	2,744	5,010	+ 2,266	25	94.537	+ 42,071
Nelson Corporation.....	,, 25	235	212	— 23	3½	830	+ 59
N'castle-on-Tyne Corp.	,, 25	4,558	4,884	+ 326	4	19,490	+ 2,590
Newport (Mon.) Corp....	,, 25	705	788	+ 83	4	3,194	+ 407
New St. Helens & Dist...	,, 22	749	814	+ 65	43	34,931	+ 3,190
Northampton Corp	,, 24	554	564	+ 10	3½	2,100	+ 243
Nottingham Corp.	,, 23	3,268	3,302	+ 34	3½	11,744	+ 801
Oldham Corporation ...	,, 26	2,106	2.321	+ 215	5	11,313	+ 1,321
Portsmouth Corp.....	,, 25	2,008	2,303	+ 295	...	...	...
Preston Corporation ..	,, 22	813	861	+ 48	4	3.573	+ 815
Provincial	,, 18	1,610	2,718	+ 1,103	29	50,004	+ 3,202
Reading Corporation ..	,, 23	643	697	+ 54	3	2.454	+ 385
Rochdale Corporation	,, 25	1,566	1,623	+ 57	4	6,483	+ 873
Rotherham Corp.....	,, 29	918	910	— 8	4	3,984	+ 286
Salford Corporation ..	,, 27	4,872	5,099	+ 227	4	20,410	+ 1.542
Sheffield Corporation..	,, 26	7,154	7,469	+ 315	4½	35,429	+ 2,573
Southampton Corp.....	,, 22	1,248	1,319	+ 71	3	4,301	+ 443
Southend-on-Sea Corp.	,, 22	692	930	+ 238	4	3,334	+ 1,235
South Met. Trys.	,, 24	921	1,227	+ 306	17	17,102	+ 4,994
South Shields Corp.....	,, 25	650	749	+ 99	3½	2,869	+ 669
Sunderland Corp.....	,, 26	1.276	1.373	+ 97	4	5,502	+ 560
Sunderland District ...	,, 23	566	595	+ 29	25	14.376	+ 1,427
Swindon Corporation'...	,, 22	160	177	+ 17	3	599	+ 185
Trys. (M.E.T.) 'Buses	,, 25	3.050	10,083	+ 7,033	17	140.593	...
Tyneside Trys. & Tmrds	,, 22	459	510	+ 21	16	8,342	+ 573
Wallasey Corporation	,, 25	1,116	1,269	+ 153	3½	4,758	+ 710
Walsall Corporation ...	,, 25	602	598	— 4	17	10.375	+ 362
Walthamstow U.D.C....	,, 25	734	808	+ 74	4	3,193	+ 807
Warrington Corp.....	Mar. 26	476	428	— 48	51	22,929	+ 336
West Ham Corporation	April 23	2,756	2,801	+ 15	3	9,889	+ 1,172
Wigan Corporation	,, 23	1,420	1,437	+ 17	3	5,255	+ 561
Wolverhampton Corp	,, 29	1,002	1,018	+ 16	5	4,727	+ 596
Yorkshire (W. Riding)	,, 26	1,432	1,408	— 24	17	24,329	+ 1,564

* From such of the services as were working both last year and this year the receipts show an increase of £1,412 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London.....	April 25	£5,034	£4,704	— £330	17	£86,284	— £4,085
City and South London	,, 25	2,850	2 590	— 260	17	47.339	— 3,700
Liverpool Overhead.....	,, 26	1,628	1,764	+ 136	17	28,121	+ 1,052
London Electric.....	,, 25	14,335	13,980	— 355	17	246,585	+ 640
Mersey	,, 25	2,145	2.153	+ 8	17	39,472	+ 133
Metropolitan	,, 26	16.603	18,187	+ 1,584	17	304,052	+ 26,987
Metropolitan District..	,, 25	13.601	13,006	+ 405	17	224.263	+ 508

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TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, April 30.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	69½ — 71½
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	...	4⅞ — 4⅞
5	Do. 5½% Cum. 2nd Pref.	...	4⅞ — 4⅞
100	Do. 4% Deb. Stk. Red.....	...	92½ — 94½
100	Do. 4½% Deb. Stk. Red.....	...	98¼ — 101½
100	Do. 5% Deb. Stk. Red.....	...	96½ — 98½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 — 106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅛ — ¼
1	Do. 5% Cum. Pref	...	½ — ¾
100	Do. 4½% 1st. Mort. Deb. Stock, Red.	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	...	85 — 87
10	Blackpool and Fleetwood Tramroad Co.	...	14 — 15
	Bombay Elec. Supply and Trams. Co., Ord.	...	14 — 15
10	Do. do. 6% Cum. Pref.....	...	10¾ — 11½
100	Do. do. 4½% Db. Stk Red.	...	94½ — 96½
$100	Brazilian Traction Light and Power Co. Lim.....	+ ½	78⅛ — 80⅛
5	Brisbane Elec. Trams. Investment Co. Ltd., Ord.	...	7⅛ — 8
5	Do. do. 5% Cum. Pref	...	4⅞ — 5⅜
100	Do. do. 4½% 1st Deb Stock, Red. ...	...	98 — 101
10	Bristol Tramways and Carriage Co.	...	6¾ — 7
10	Do. do. 4% Cum. Pref.	...	6⅞ — 7⅛
100	Do. do. 4% Deb. Stock	...	100 — 102
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	— 5	112 — 116
100	Do. Pref. Ord. Stock	— 1	104 — 108
100	Do. 5% Cum. Perpetual Pref. Stock.....	...	102 — 105
100	Do. 4½% 1st Mort. Debs.	...	96 — 99
40	Do. 4½% Vancouver Power Debs.	...	94 — 98 xd
100	Do. 4½% Perpetual Cons. Deb. Stk.	...	93¼ — 95¼
100	British Elec. Traction Co., Lim., 6% Cum. Pref.....	— 1	88 — 91
100	Do. 7% Non-Cum. Pref	...	56 — 59
10	Do. 6% Pref. Ord. Non-Cum.	...	15½ — 17½
100	Do. Deferred Ord. Stock	...	6¼ — 8¼
100	Do. 5% Perpetual Debenture Stock.....	...	93 — 95
100	Do. 4½% Second Debenture Stock, Red	— 2	77 — 80
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	73 — 78
100	Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb.	— ½	99¼ — 101½
5	Calcutta Tramways Co., Limited, Ord.	— ⅛	6⅛ — 7⅛
5	Do do. 5% Cum. Pref.	...	5 — 5¾
100	Do. do. 4½% 1st Deb. Stock, Red.	...	97 — 100
1	Cape Electric Tramways, Ld., ...	...	⅝ — ¾
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	3 — 3¾
100	Do. 5% Debs. Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co. (1904), Lim.	...	5¾ — 5½
100	Do. 4% Debenture Stock Red, 1905	...	91 — 96
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.	— 2	87 — 91
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	...	93 — 96
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	— 6⅞
10	Dublin United Trams. Co. (1896) Lim. Ord.	..	— 10¼
10	Do. do. 6% Pref.	— ⅛	— 12½
100	Do. do. "A" Red.	...	— 80¼
100	Do. do. Deb. Stock "B" Red. ...	+ 1	— 80
10	Gateshead & Dist Trys. Co., Ord.	...	8½ — 9
10/-	Hastings & Dist. Electric Trams. Co. Ld., Ord.	...	⅜ — ½
1	Do. do. 6% Cum. Pref.	...	⅝ — ¾
100	Do. do 4½% Deb. Stk. Red.	...	65 — 70
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	93½ — 97½
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.).....	...	86 — 90
10	Imperial Tramways, Ord.	...	3 — 3½
10	Do. do. 6% Cum. Pref.....	...	6¼ — 6¾
10	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref....	...	2 — 2½
100	Do. 4% Debenture Stock	...	73 — 78
1	Kalgoorlie Elec. Trams., Ltd.	...	0 — ⅛
100	Do. do. 5% "A" Deb. Stk.	— 1	84 — 89
100	Do. do. 6% "B" do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.....	— 3/2	8⅜ — 8¾
10	Lanarkshire Tramways Co.	...	9¾ — 10¾
100	Lancashire United Tramways. 5% Prior Lien Deb.	...	87 — 89
1	Lisbon Electric Trams., Lim., Ord.	...	1⅛ — 1⅜
1	Do. 6% Cum. Pref.	...	⅛ — 1⅛
100	Do. 5% Mort. Debs.	...	95 — 100
1	London and Suburban Trac. Co., Lim., Ord.	...	⅛ — ⅜
100	London General Omnibus Company, Limited, 4½% Deb.	...	98¾ — 100½
100	Do. Do. 5% Cum. Inc. Deb. Stk. Red.	...	89 — 92
100	London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red	...	56 — 60
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref.....	...	4¾ — 5¼
5	Do, do. 5% Deb. Stk., Red.	...	101 — 103
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	78 — 81
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	— 2	105 — 108
$1,000	Do. do. 5% Bds.	...	98¼ — 100¼
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	⅛ — 1⅛
100	Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. ..	...	88 — 91
100	Do. 5% Deb. Stock, Red ..	...	85½ — 88½
100	Mexico Tramways Co., Common Stock	+ 4½	65 — 69
500	Do. Gen. Con. 1st Mort. Gld. Bonds	+ 5	76 — 80
100	Do. 6% 50-yr. Mort. Bonds	+ 1	71 — 76
...	Michigan United Railways 5% 1st Mort. Gld. Bonds ...	...	91½ — 93½
100	Montreal Street ailway, Sterling 4½% Debs. (1923).....	...	98 — 100
100	Do. 4½% Sterling Debs, (1922) ...	...	99 — 101
1	National Steam Car Co. Ltd.	— 1/32	⅝ — ¾
10	Oldham—Ashton and Hyde Elec. Ord.	...	6 — 6½
10	Do. do. 5% Cum. Pref.	...	5⅜ — 6⅛
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	3⅞ — 4⅜
5	Do. do. 6% Cum. Pref.	...	4 — 4½
1	Perth (W.A.) Elec. Trams., Ld., Ord.	...	— —
1	Potteries Electric Traction Co., Ltd., Ord.	...	⅜ — ½
1	Do. 5% Cum. Pref.	...	31/32 — 1
100	Do. 4½% Debenture Stock, Red.	...	84 — 87
1	Provincial Tramways, Lim., Ord.	...	1⅛ — 1⅜
10	Do. 5% 1st Deb. Stock	— 2½	92½ — 95½
...	Puebla Tramway, Light & Power Co., Prior Lien 5% ...	— 2	73 — 78
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.....	...	5 — 5½
100	Do. do. 4½% 1st Mt. Db. Stk.	...	95 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	87 — 89
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	— ½	95½ — 97½
100	Do. do. 5% 50-yr. Mort. Gold Bonds	...	89 — 91
100	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	...	96 — 100
$500	Do. 5% 1st Mort. Debs., Red., 1929	...	96 — 99
10	Shanghai Elec. Construction Co.	...	12¾ — 13¾
100	Singapore Elec. Tramways Lim., 5% Debs. Red	...	88 — 93
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ...	...	⅝ — ¾
100	Do. do. 4% Deb. Stk.....	...	66 — 70
...	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	95 — 97
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	97 — 99
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	83 — 85
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	90 — 92
5	United Elec. Tramways of Monte Video, Ord.	...	4⅝ — 5⅛
5	Do. do. 6% Cum. Pref.	...	4⅞ — 5⅜
100	Do. do. 5% 1st Deb. Stk. Red.	— 2½	92½ — 95½
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	93¼ — 95½
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	⅛ — ⅜
5	Do. do. 6% Cum. Pref.....	...	4¼ — 4⅞
100	Do. do. 4½% 1st Deb. Stock. Red.....	+ 1	84 — 87

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

FOUNDED 1892. LONDON, MAY 7, 1914. VOL. XXXV.

LONDON AND NORTH WESTERN RAILWAY ELECTRIFICATION.

OPENING OF THE FIRST SECTION.

On May 1 the first section of the great scheme of railway electrification which is being carried out by the London and North Western Railway Company came into operation. This consists of the West London section, from Willesden Junction to Addison Road, and of the West London extension of that line from Addison Road to Earl's Court, where a junction is made with the Metropolitan District Railway. This line, which consists of four or more tracks, is used for through connecting trains by several railway companies, and it is largely of a suburban character. Two of the tracks have been equipped electrically, giving a total of 7½ miles, measured as single track.

It was on November 18, 1911, that the London and North Western Company officially announced their new scheme of electrification, intended to develop and supplement their electric railway from Euston to Watford, which was authorised by Parliament in 1907. In our issue of December 7, 1911, an extended description was given of the various routes to be changed from steam to electric traction, and dealing also with the new railway running alongside the existing main line from Chalk Farm, a little outside of Euston, to Watford and Croxley Green. The accompanying map (Fig. 1) shows all the lines in question, together with the new connecting railway which is being made from Paddington to Queen's Park, Willesden, as an extension of the Baker Street and Waterloo Railway. The

Electric Conductor Rails at a Cross-over Kensal Green Sidings.

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following table shows the approximate route length of the various sections:

	Miles.
Watford to Euston	18
Branches at Watford	3
North London Railway	5¼
Hampstead Junction Railway	5½
Willesden to Earl's Court	3¾
Willesden to Kew Bridge and Gunnersbury..	4½
Paddington to Queen's Park (Bakerloo) ..	1½
	41½

As the electrified lines are double track throughout, the total length of single track equipped is over 80 miles.

Without repeating all the explanations given in former articles, it may be briefly pointed out that, as the map shows, communication will be provided electrically between Watford in the north-west and Willesden Junction, Kew, Richmond, Earl's Court, the detour between Broad Street in the City of London, *via* the North London Railway to Willesden, then on by the West London extension to Earl's Court, and from Earl's Court over the Metropolitan District Railway to the Mansion House. After the District Railway was electrified in 1905, these trains continued to run for some time, the steam locomotive being changed for an electric one at Earl's Court to take the train to the Mansion House through the tunnels, while on returning a converse change was made at the same west end station. Owing to the inconvenience of fitting in these North Western trains at Earl's Court with the very frequent service on the District Railway, an arrangement was come to after a time between the District and North Western Companies under which this circular service was abolished. A shuttlecock train was substituted, which, until the end of April, continued to run between Earl's Court and Addison Road, passengers going to or coming from Willesden having

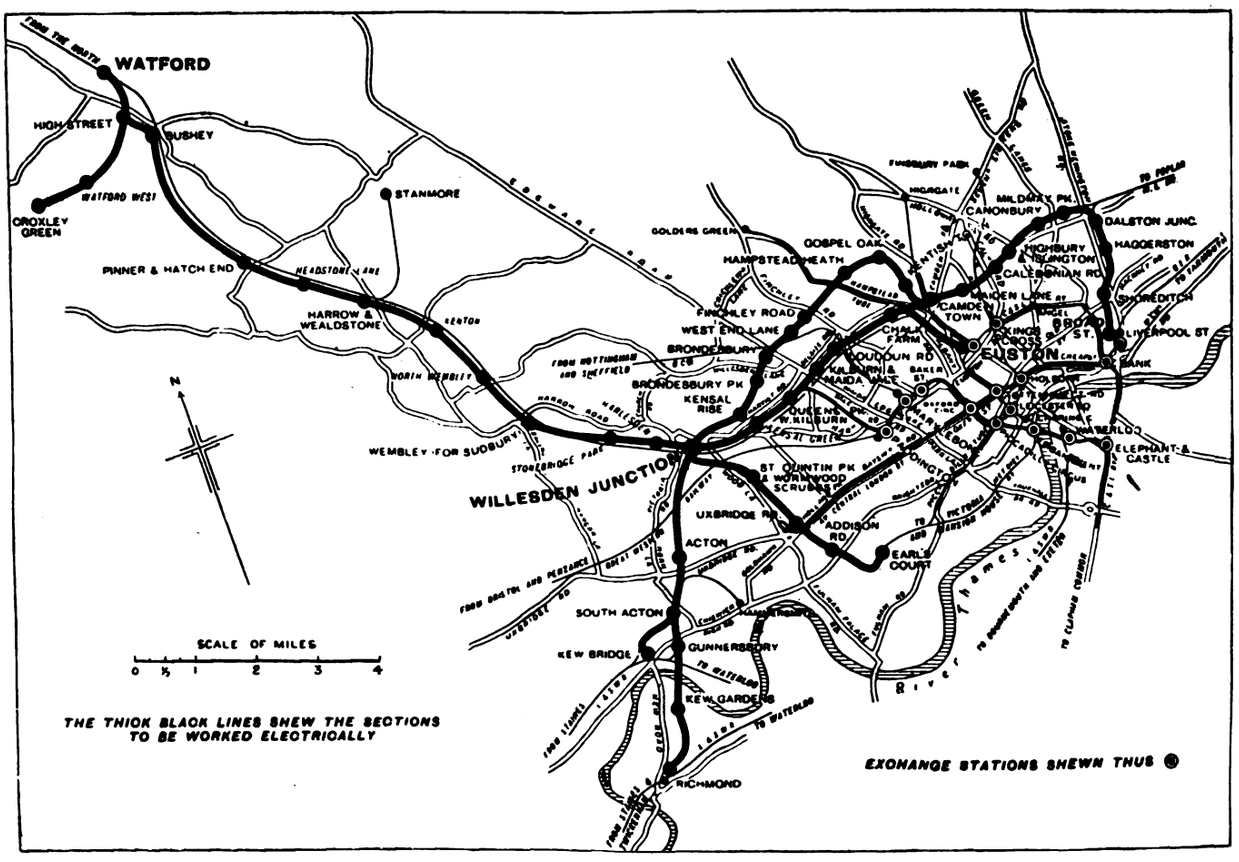

Fig. 1.—Electrification of London and North Western Railway in London and Suburbs.

west end and south of London *via* Baker Street and Waterloo Railway, Hampstead, Euston, and round by the North London Railway to Broad Street in the City. The railway to Watford is now far advanced, and the same may be said of the extension of the Baker Street and Waterloo line, towards which the North Western Company are contributing part of the cost. The electrical work is being carried out under the advice of the North Western Company's chief electrical engineer, Mr. F. A. Cortez-Leigh, to whom we are indebted for the particulars and illustrations given in the following article.

A general view of the scheme on its electrical side appeared in our issue of January 9, 1913, and we confine this notice to an account of the West London section, on which electric traction is now begun. It will be remembered that in former times London and North Western steam trains ran regularly by a great to change trains at Addison Road. In the inauguration now made of electric traction the trains run through between Earl's Court and Willesden, but until further traffic arrangements have been made the service will continue to be a quarter-hourly one, only three electric trains of three carriages each being employed.

In view of the connections with the District Railway at Earl's Court, with the electrified section of the London and South Western Railway at Gunnersbury and Richmond, it was natural that the system of traction adopted should be the same as that employed on the District and this part of the South Western lines. Accordingly third and fourth-rail conductors have been laid down, and a working pressure of 600 volts is used. Pending the completion of the London and North Western Company's electric power-station at Stonebridge Park, the current for working the trains on the West London line is obtained from adjoining sub-stations

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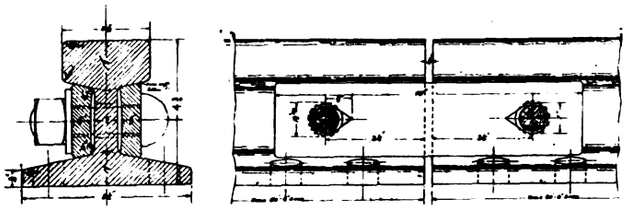
Fig. 2.—Laying Jumper Cables.



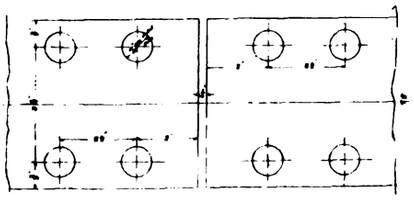
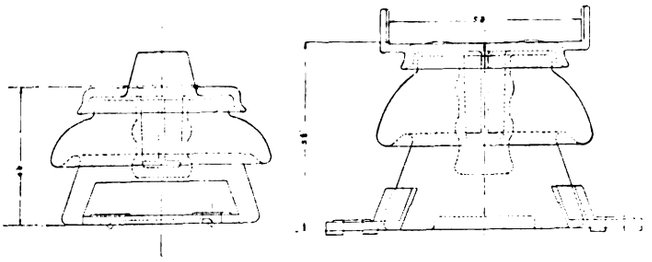


Fig. 3.—Detail of Conductor Rail.



Negative. Positive.

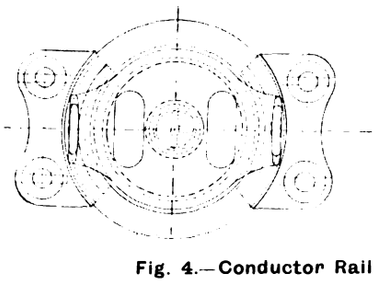
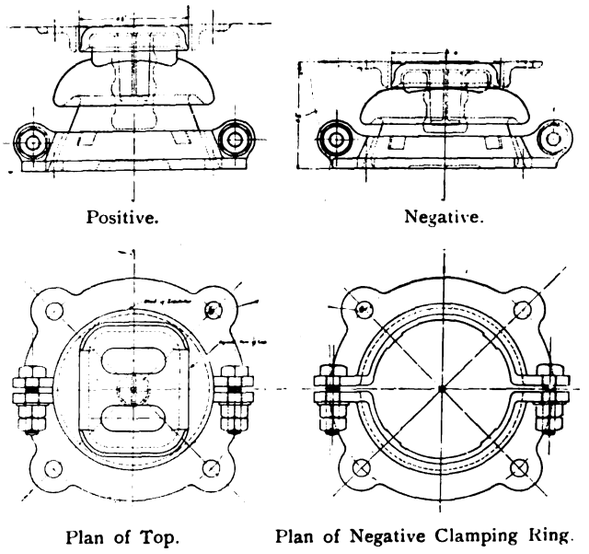


Fig. 4.—Conductor Rail Insulators.



Positive. Negative.

Plan of Top. Plan of Negative Clamping Ring.

Fig. 5.—Conductor Rail Anchor Insulators.

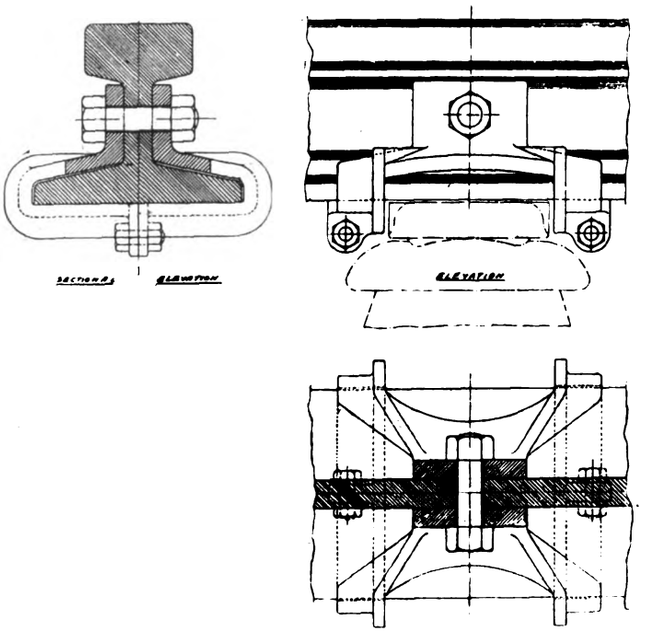


Fig. 6.—Conductor Rail Clip for Anchor Insulator.

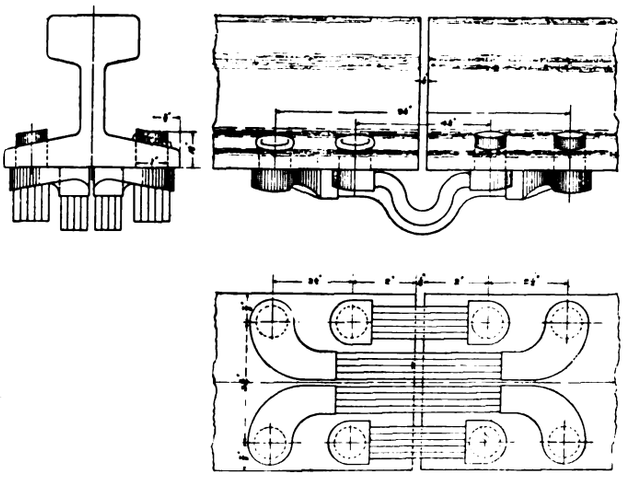


Fig. 7.—Detail of Conductor Rail Bond.

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of the Great Western and District Railway Companies. For inaugurating the service the District Railway rolling stock is also being utilised.

The high-tension cables which will be employed for the North Western scheme generally will, as far as possible, be carried on short posts alongside the railways, but for this particular line, under present arrangements of feeding from adjacent sub-stations of other railway companies, few cables other than those of the low-tension kind are at present required. The low-tension cables, and also the lengths of low-tension jumper cables, are laid underground, the process of laying being shown in Fig. 2. The conductor rails, which may be seen in the photographic views, and also in Fig. 3, are of special low carbon soft steel. They weigh 105 lb. per yard, and have a chemical composition of: Carbon, 0·044; manganese, 0·139; silicon, 0·03; phosphorus, 0·011; sulphur, 0·029; nickel, 0·255 per cent.

The electrical resistance of this steel is approximately 6½ times that of copper. These rails were made by the Cargo Fleet Iron and Steel Company, Middlesbrough. They are supported on porcelain insulators, the form of which is shown in Fig. 4, and the insulators

Fig. 8.—Hydraulic Rail Bonding Machine.

are attached to the sleepers by malleable iron clips. Special anchor insulators are used at intervals to prevent creeping of the rails, and their construction, together with the form of clip, are shown in Figs. 5 and 6. All the insulators come from Messrs. Doulton and Company.

The form of ramps employed at junctions and cross-overs may be gathered from the illustration showing the track at Kensal Green sidings (page 349). This shows both a fork-ended ramp and a side ramp for guiding the shoe of the motor car. On the other lines which the London and North Western Company are electrifying, instead of the side ramp, the conductor rail is depressed for a short distance, but remains as far as possible continuous. The trailing ramps are made of cast iron, and the leading ramps on the through lines are of forged steel, and on sidings of special cast steel. The conductor rail bonds, which are shown in Fig. 7, were supplied by the Forest City Electric Services Company, Salford. They have solid drop-forged heads, and are fixed into the rails by hydraulic pressure. One of the hydraulic machines at work is shown in Fig. 8. The jumper cables, which come from W. T. Henley's Telegraph Works Company, are laid solid in bitumised fibre troughs. Mr. Cortez-Leigh's patent sealing terminal, which is used for these cables, is shown in Fig. 9. It has been designed to form an effective seal to the insulation of the cable and, at the same time, to prevent damage to the cables from mechanical shocks and vibration. Messrs. Henley's firm also provided the

Fig. 9.—Sealing Terminal for Cables.

feeder and sectionalising switch pillars, one of which is illustrated in Fig. 10.

The Metropolitan District Railway rolling stock, which for the moment is being employed, requires no description, but the following account of the four new trains which are on order will be of interest. Three of these will be in service, and one spare. The trains are being built by the Metropolitan Carriage, Wagon, and

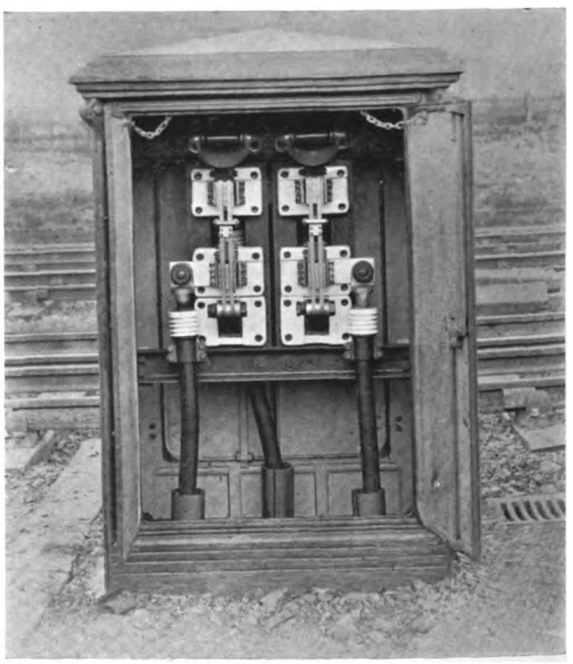

Fig. 10.—Feeder Section Pillar.

Finance Company, and each consists of a motor coach, a trail car, and a control trail car. A plan of the train is shown in Fig. 11, while the plan design of each of the three cars may be seen more in detail, and on a larger scale in Fig. 12. End doors are used with through communication, and both cross and longitudinal seats

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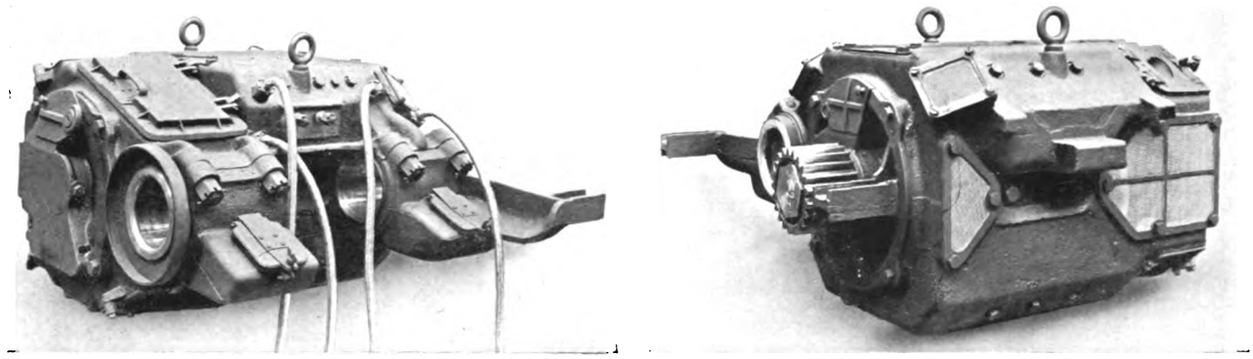
are provided. The electric control gear, manufactured by the Siemens Brothers Dynamo Works, is placed in a steel compartment at the outer end of the motor coach, and all parts are readily accessible. In Figs. 13 to 17 may be seen specimens of the motors, each, carried on bogie trucks of specially strong design. The controller is fitted with a dead-man's handle, automatic quick-connecting brake, and the usual hand brakes are provided for emergency use. The air compressors on two of the trains are of Westinghouse



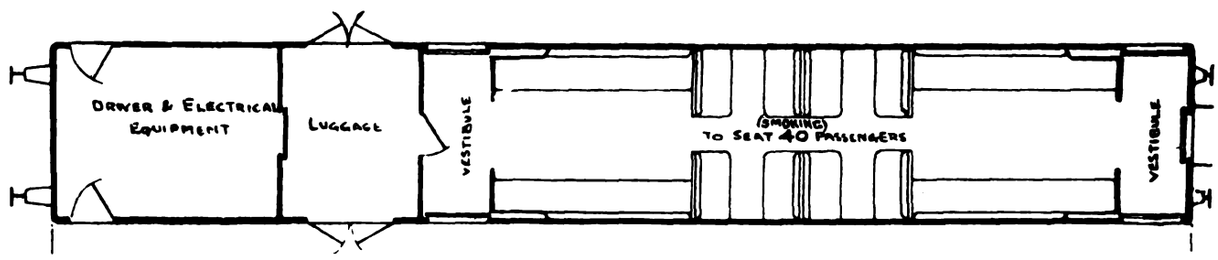
Figs. 13 and 14.—Views of Motor.

contactors, reversers, and circuit breakers. The train can, of course, also be controlled from a control compartment at the opposite end, so that it can be driven readily in either direction. In order to provide for rapid acceleration and a high running speed, each motor car is fitted with four motors of 250 H.P. make, and on the other two they are of the Knorr Brake Company's rotary slide valve type.

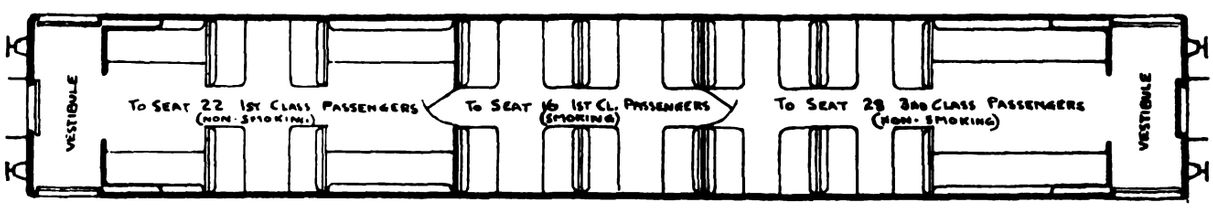
In regard to the progress of the North Western Company's power-station at Stonebridge Park, the building is now nearly ready for the machinery. The latter will include five Westinghouse turbines of 5,000 KW.

Motor Car. Trail Car. Driving Trail Car.

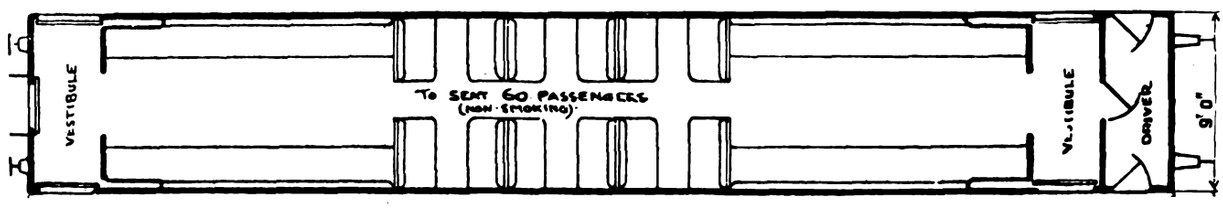
Fig. 11.—Diagram of Electric Train—Total length, 179 ft.



57 ft.
Motor Car.


VESTIBULE
TO SEAT 22 1ST CLASS PASSENGERS (NON-SMOKING)
TO SEAT 16 1ST CL. PASSENGERS (SMOKING)
TO SEAT 28 3RD CLASS PASSENGERS (NON-SMOKING)
VESTIBULE

57 ft.
Trail Car.



57 ft.
Driving Trail Car.

Fig. 12.—Detail Plan of Cars.

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each, driving Siemens three-phase alternators, which will generate three-phase current at a pressure of 11,000 volts with a periodicity of 25 cycles per second. The auxiliary machinery will be driven by alternating-current motors supplied through step-down transformers, or from a low-tension turbo-generator set used also for lighting. The air pumps for the surface condensers will be driven by steam turbines, and the circulating water pumps by electric motors.

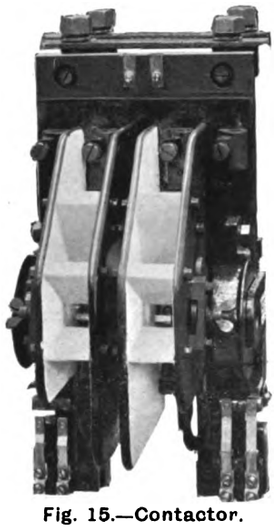

Fig. 15.—Contactor.

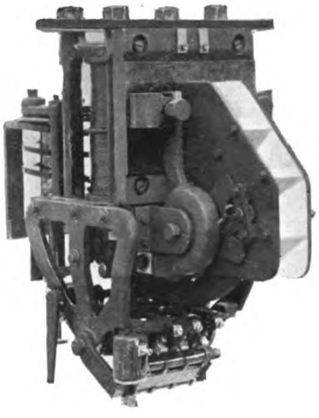

Fig. 16.—Circuit Breaker.

Twenty Babcock and Wilcox boilers with the latest pattern of drop-link automatic stokers, superheaters, and Green's economisers will supply steam. The boilers are arranged in two rows with a separate chimney for each row. Each chimney will be 240 ft. high and 14 ft. in internal diameter. The coal and ash handling plant is being supplied by Babcock and Wilcox, Limited; it includes two tray conveyors for bringing the coal from a large storage ground at the end of the site, and two bucket conveyors for lifting the coal to the top of the boiler house and conveying it to the bunkers. The coal will be automatically weighed by Avery weighing machines, and the ashes and soot will be dealt with by a pneumatic system. The site which has been obtained is of great area, and will allow of the plant being more than doubled in size. The coal store will accommodate about 20,000 tons of coal, all of which can be handled mechanically. A considerable quantity can also be stored in the immediate vicinity, should the occasion arise. The coal will come from mines situated on the London and North Western Railway system, and sufficient for a day's working will be delivered every day to replace the amount burned.

High-tension feeder cables will be laid from the power-station to ten sub-stations at Bushey, Hedstone Lane, Kenton, Willesden Junction, Queen's Park, West-end Lane, Chalk Farm, Dalston, Broad Street, and South Acton. There will also be a sub-station at the power-house. The high-tension cables are three-core, paper insulated, lead covered, and armoured, and are made by the British Insulated and Helsby Cables, Limited. In each sub-station there will be three rotary converters, nine static transformers, a large storage battery, and an automatic reversible booster. The batteries will relieve the peak load, and will be capable, if necessary, of running trains for some time. The rotary converters are of 750 KW. and 1,000 KW. normal rating, with a large over-load capacity, and they are of the self-synchronising type. The transformers, which are oil-cooled, are made by the British Electric Transformer Company, and the sub-station plant by the British Thomson-Houston Company.

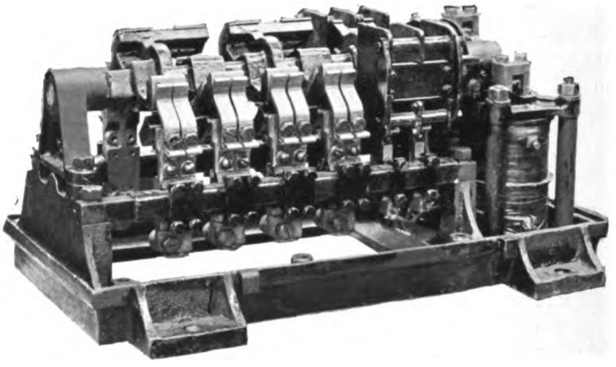

Fig. 17.—Reverser.

The first consignment of motor cars to be used on the Watford line and its other connections apart from the West London, are being built by the Metropolitan Carriage, Wagon, and Finance Company, and the trail cars at Wolverton by the London and North Western Company. The electric equipment of these trains is being constructed by the Maschinenfabrik Oerlikon. The general arrangement and the power of the motors will be similar to those of the trains running between Earl's Court and Willesden.

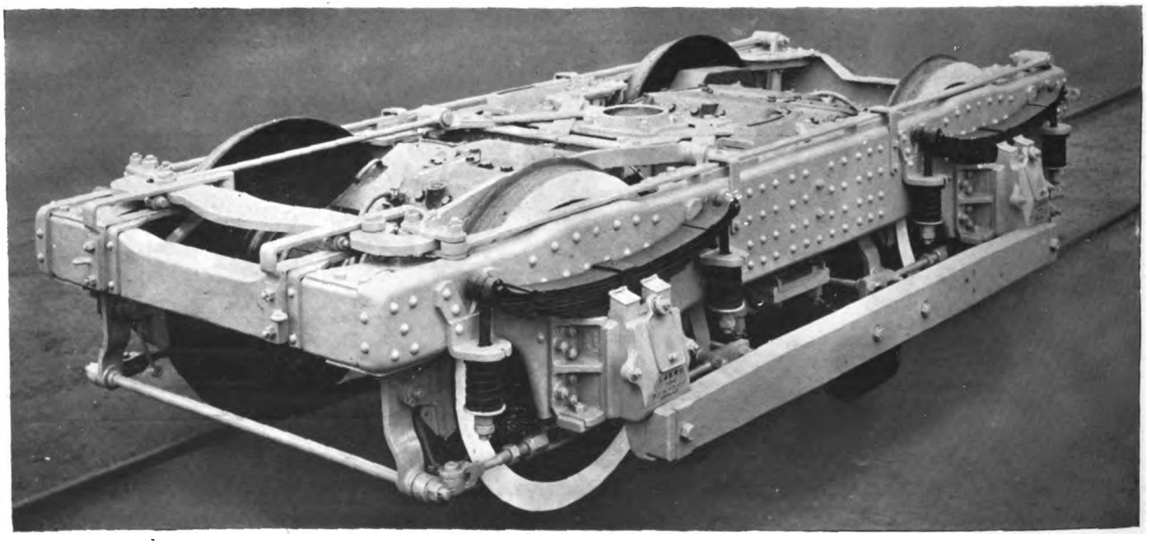

Fig. 18.—Motor Truck with Motors in Position.

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THE SPENCER-DAWSON POWER BRAKE.

The importance of adequate and reliable braking appliances on tramway cars needs no emphasis in these pages. In 1908 and 1909 respectively the reports of the two tramway associations put on record the conditions which should be fulfilled by a perfect braking equipment, and also the results of numerous tests and investigations with existing forms of brakes, and the influence of variable working conditions, especially traffic, gradient, speed, and rail surface, upon the efficiency of various types. These reports directed attention to the question, and a considerable number of new brakes, or improvements in known patterns, have been put upon the market since.

Every tramway manager and engineer recognises that service conditions are so complex and varied that until a new appliance has been tried out in actual work over a considerable period, it would be rash and hazardous to adopt it upon a large scale, or to regard it as other than experimental. This is especially the case with a brake, not only because life and limb may depend upon its reliability, but because on lines working under difficult conditions of traffic and gradients the reliable overall speed of the service, *i.e.*, its regular and punctual working, depends as much upon the good working of the brake as upon that of the motors.

So that to develop a new tramway brake into a commercial form it is essential to use it on a working line, and to modify it in accordance with experience until assurance is obtained that weak points have been eliminated, that the whole design is dependable, and that the apparatus will meet the difficult and variable conditions of everyday working. This method of development requires the use of a tramway as an experimental ground, and the expenditure of a good deal of time.

The brake described below has been designed and developed by Messrs. C. J. Spencer and J. W. Dawson, respectively general manager and engineer to the Bradford City Tramways, confessedly as an attempt to fulfil the requirements set out in the report of the Brakes Committee of the Municipal Tramways Association, as well as the requirements of the Bradford Tramways. The Bradford tramway system is distinguished for long and severe gradients; it has practically no level track. In the central area it is traversed by general traffic of a fairly dense and rather heavy character in streets not too wide, and it has to deal with the usual rush hours' traffic of an industrial and commercial town. It is therefore a pre-eminently suitable field for testing brakes in practice, especially in respect to the safe and reliable working of severe gradients. The inventors have used their brake in service at Bradford for three years, as regards the first set, and for two years to the extent of 14 sets, so that it has had a very fair period of test for development and elimination before being put upon the market.

The brake belongs to the class of mechanically-applied track brakes, four slippers or brake blocks being applied to the rails, as near to the wheels as can be arranged, each pair being carried on an equalising lever to which the weight of the car is applied centrally. This is shown in Figs. 2 and 3, a side view of a car, in which the wheels, brake shoes, equalising levers, and central plunger are well seen.

Fig. 1.—Side View of Car with Spencer-Dawson Brake.

The immediate force applied to the shoes is that of a pair of coil springs, contained in a casting bridging the side frames of the truck in the centre of its length, acting through two sets of bell cranks, and compressed to the extent necessary to put upon the shoes a predetermined proportion of the weight of the car. This spring force is opposed and held off by oil pressure on the piston of a hydraulic cylinder, contained in the same casting, and acting directly in line with the springs, which are concentric with the piston rod. The brake is applied by allowing oil to escape from the cylinder; the springs expand and apply more or less pressure to

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the blocks, according to the amount of oil permitted to escape. The oil pressure is maintained by a pump driven by an eccentric on one of the axles, which delivers the oil into a receiver against an air pressure. The receiver is a steel vessel similar to a compressed

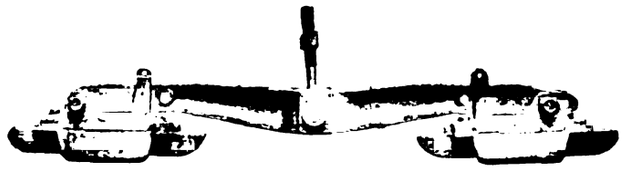

Fig. 2.—Brake Blocks and Equalising Lever.

gas cylinder, carried on one of the platforms in a vertical position, the oil entering and leaving at the bottom, so that the air remains in the upper part of the cylinder, and does not enter the pipe system under any normal working conditions.

The power system of the brake is therefore composed of a spring force acting always in the direction of "brakes on," restrained by air pressure acting through oil, and applied by permitting the escape of oil from the pressure system, and the consequent expansion of the springs, which puts some of the car weight on to the blocks. The oil so released runs into a sump, and is at once picked up by the pump. No air is released from or forced into the receiver. The pump is only loaded when there is oil in the sump, as it will not pump air, and it therefore only operates and only absorbs energy as and when the brake is used. The wheel brake gear is fitted with small hydraulic plungers, to which the pressure oil may be admitted, as well as the usual hand wheel gear.

The operating gear on the platform (Fig. 4) consists of an upright column, with a radial hand lever and spring catch moving over a catch plate with four notches. The notches mark the following positions of the brake valve: Off, coasting, full on, wheel brakes on. The

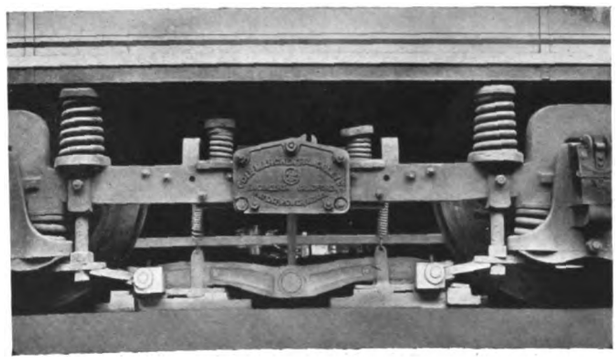

Fig. 3.—Side View of Brake as Fitted on Car.

"coasting" notch applies sufficient pressure to the shoes to permit the car to descend gradients, and by the use of an "overlap" on the control valve the pressure can be adjusted by turning momentarily to the "off" or to the "full on" notch, so that the pressure can be regulated to suit the gradient and the traffic, holding the car to a safe speed, and giving an elastic control. The "full on" notch applies the predetermined maximum pressure to the track shoes, and the last notch applies the wheel brake blocks in addition.

The platform operating gears act on the control valve through a floating lever. The brake can be put "on" from either platform at any time, but it can only be put "off" from the platform at which it was applied. Hence, in case of need, the conductor can put on the brake, but he cannot take it off after the driver has put it on; nor can the driver release it after it has been put on by the conductor, nor can either man prevent the other man from putting the brake on. If pressure fails, or falls sensibly from pipe or valve leakage, the brake is put on. The principle followed throughout is that any failure puts the brake on, and so announces itself. This, obviously, is the condition of safety. The accompanying photographs explain the detailed construction of the brake, and show the practical form into which it has been worked out.

The brake blocks are of cast iron, flanged so that there is little tendency to derailment even if 70 or 80 per cent. of the weight of the car is taken on the blocks, and rounded off at the ends. The material is of importance, and Messrs. Spencer and Dawson have made prolonged trials of various mixtures. At Bradford they are convinced that a proper grade of cast iron is the most satisfactory, but in other districts the prevalent rail conditions may justify the choice of wood, and any suitable material can be adopted. The blocks are rights and lefts, but otherwise interchangeable, and are

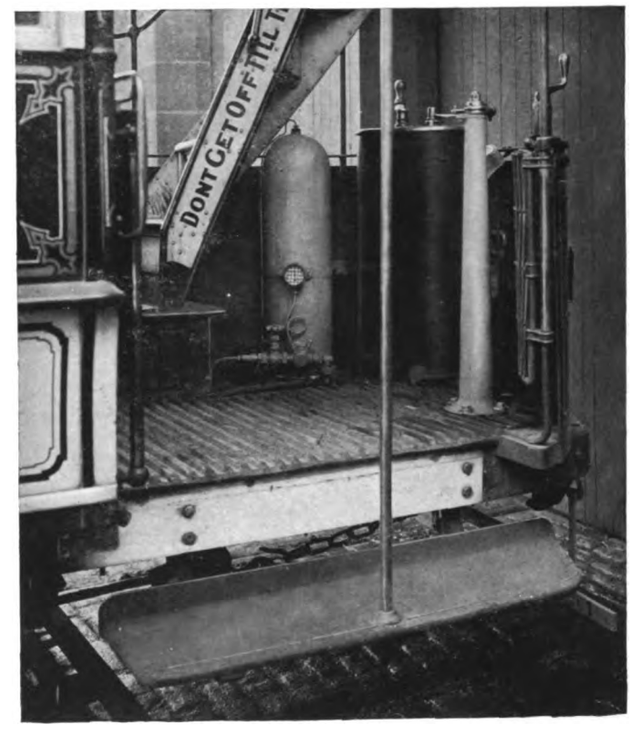

Fig. 4.—Platform Gear, Including Air Reservoir.

each held in the shoes by two tap bolts. They are self-fitting, and can be worn to a very small thickness, so that the amount scrapped is small. The two blocks on one side of a car are carried at the ends of an equalising lever of cast steel, as close to the wheels as they can be got. This equalises the pressure, and gives the car reasonable longitudinal stability, although a great part of the weight is off the wheels. Tension rods from the axle boxes and cross tie rods keep the blocks to gauge and in their proper positions over the rails at all times. Pressure is applied at the centres of the equalising levers by plungers connected below to the levers with an adjustment to take up block wear, which can be set for a definite clearance, and therefore a definite loading of the blocks: and above to the bell-crank levers acted on by the brake springs. These bell cranks and the plungers and guides are contained in the outer ends of the steel casting which carries the whole of the motion, and which spans the truck in its centre. This casting or trunk contains the coil springs, which are right and left

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handed, and surround the piston rod; the hydraulic cylinder, the pressure on which restrains the springs; the oil pump, driven by a rocking rod off an eccentric on one of the axles; and the control valve, which regulates the outflow of oil from the cylinder, and therefore the application of the brakes. All this motion is enclosed, it is all lubricated by the oil, since the exhaust oil runs over the springs and rod on its way to the oil well of the pump. The valve box and the pump can be

The connecting tubes throughout are of solid-drawn steel, the cast work is of high-grade cast steel, grease lubrication is provided for the external moving parts, and such pins, etc., as have to carry heavy pressures (*e.g.*, the plungers carrying the equalising levers) are case hardened. With the exception of a few pieces which must be ground fits, such as the plug valve, the parts are interchangeable, and the various parts are made on the "unit" principle, so that a pump, or a valve

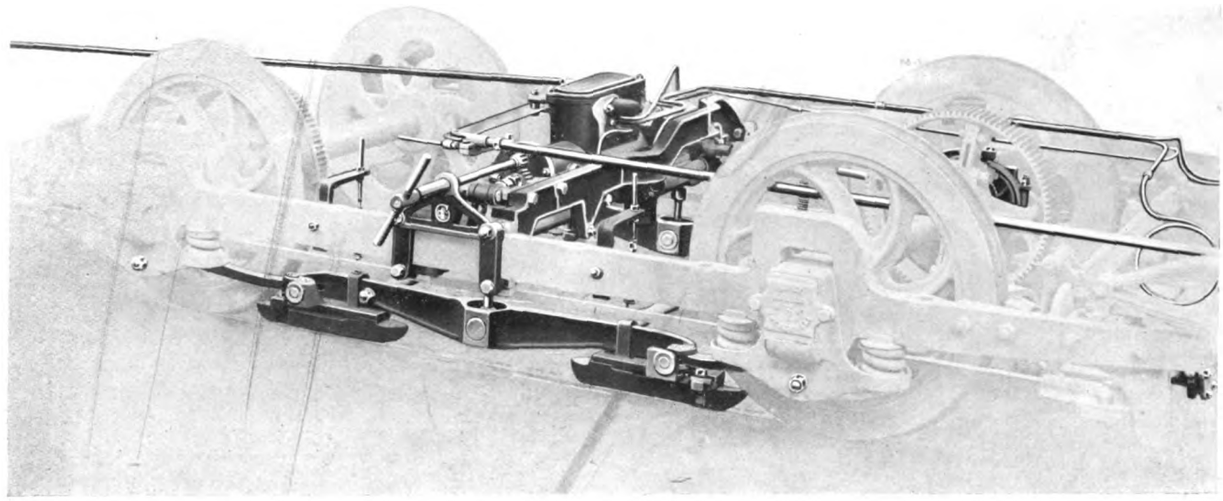

Fig. 5.—General Arrangement of Spencer-Dawson Brake on Four-Wheeled Truck.

readily detached and exchanged, so that any examination of these is made on the shop bench, and not in the shed pits, and the tube connections are made directly with those parts, and not through channels or parts in the casing. The exclusion of dust from all working parts, especially from the oil system, is very carefully provided for. The control valve is a plug valve, provided with ports calculated to give the correct degree of oil release for each "notch," and carrying a pinion engaged by a rack from the floating lever, to the opposite ends of

and its seating, connections, etc., can be changed without disturbing anything else.

As regards capacity for repeated stops, a full application, all on, releases 45 cubic in. of oil, whilst the pump throws 3 cubic in. per stroke, *i.e.*, per revolution of the wheels, so that in 15 revolutions from starting the full pressure will be restored. Any failure of pressure puts the brake on, so that no exhaustion of stopping power can occur, but a succession of stops with less than 15 revolutions—118 feet—between them

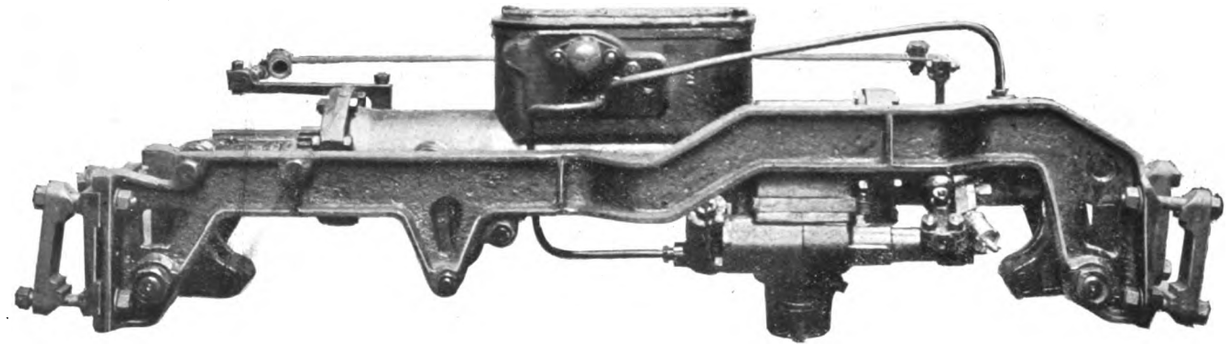

Fig. 6.—General View of Actuating Gear.

(Pump below. Valve box above. Pressure cylinder and spring box in frame casting.)

which the rods from the platform pillars are connected. As each end of the floating lever is the "power" end for one platform gear, and the fulcrum for the other platform gear, the valve can only be moved to the "off" position from the same end as it was put "on"; but if it has been put to an intermediate notch from one end, it can be further applied from the other.

In the event of an oil pipe bursting, or other defect causing the brake to stay "on," a manual gear is provided by which the springs can be compressed and the pressure taken off the blocks, so that the car can be got home to the shed without serious delay to the traffic.

will in time exhaust the power to release the brake. The regular working pressure is 350 lb. per sq. in. This seems rather startling, but risk of accident from the pressure is remote. The tubing under the car body is of quite small diameter. It contains oil, and a burst can do little harm, though it may make a mess in the street. The air vessel is of small size and capacity. It has but a single small tube connection into it, and the worst thing likely to happen in a collision is that the connection would be broken, and a high velocity stream of oil would doubtless issue, followed by air at a much reduced and rapidly diminishing pressure; but, provided

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the air cylinders are of good material and properly tested, there should be no danger of anything resembling an explosion.

The weight of the entire equipment for a four-wheel car is 12 cwts.

The manufacturing rights are in the hands of Messrs. Cole, Marchent, and Morley, Limited, of Bradford, whose name and fame as engine builders are a sufficient guarantee of reliable workmanship and material.

It will be realised that the principle of the brake is the same as that of the automatic air and vacuum brakes in use on railways, *i.e.*, that the braking force is always in being, has not to be created on the occasion, and that any defect causes a brake application.

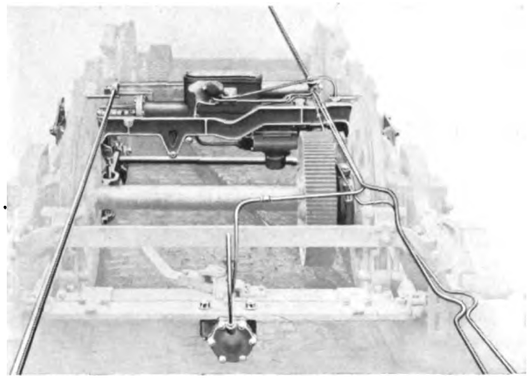

Fig. 7.—End View of Brake Gear, showing Pressure Cylinder for Wheel Brake.

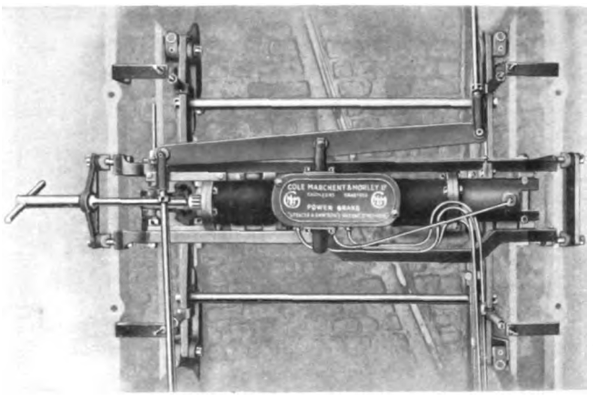

Fig. 8.—General View from Above.
(Winding-off key on left.)

A number of tests under service conditions was made at Bradford recently with the permission and assistance of Messrs. Spencer and Dawson, but under the writer's direction; also an inspection of the working drawings and of the parts in process of manufacture at the makers' works, who are hereby thanked for the opportunities given.

The car used was fitted with speed indicators, with a Wimperis inspectional accelerometer and gradient indicator, and with an Elliot's recording accelerometer, with a paper speed of 5 in. per minute. Some of the deceleration diagrams from the record are herewith reproduced, and have been used for the calculations, as they agreed well with the clocked times. The numbers of the diagrams and of the tests correspond. It was noted that the accelerometer pen did not always return to zero when the car stopped, owing to pen friction, which was neutralised by vibration whilst the car was moving, but the sharp vertical drop distinctly marks the moment of stopping.

The car on which the tests were made is a double-decked top-cover car, seating 58 passengers; unloaded weight, 9½ tons; 16 ft. body, carried on a Brush truck with 6 ft. 3 in. wheel base; gauge, 4ft. 0 in.; wheels, 30 in. diameter; brake on and in regular use since May, 1913. The rails were dry and fairly clean, not the best conditions for cast-iron blocks, and no sand was used in any of the tests.

A striking characteristic of all the stops was the smoothness and absence of shock, so much so that it was necessary to watch the driver's hand in order to "clock" the commencement of the braking interval. The accelerometer diagrams show the same thing, the maximum deceleration being generally found at the end of the stop. This is not the best condition for stopping in the shortest possible space and time, which demands the application of maximum deceleration at the commencement of the stop, but it is much more comfortable for the passengers. In Bradford the cars have the rheostatic brake, which can be utilised alternatively or conjointly with the power brake, but in the latter case the retardation due to the rheostatic brake is necessarily limited in proportion to the weight left on the wheels when the track brake is on. There seems to be no reason, however, why the Spencer-Dawson brake should not be made to act as sharply as can possibly be needed by the provision of larger oil tubes, as it is clearly the tube and valve port friction which delays the action. The inventors have rather avoided "stone wall" stopping, the value of which, as compared with its discomfort and possible risks, must be estimated for every case with special regard to the local conditions, among which the density of other traffic, and the frequency of busy street crossings are perhaps the most important.

The table of stops made shows a very fair uniformity of action, the characteristics shown being practically those found with cast-iron blocks on dry rails.

Record of Test Stops.

Stop. No.	Brake Notch.	Speed.	Gradient.	Distance.	Time.	Retardation.—Ft. per Sec.² Average.	Retardation.—Ft. per Sec.² Corrected for Gradient
		m.p.h.		feet.	secs.		
1	1st coasting	13	Level	88·2	7·5	2·54	—
2	,, ...	13	,,	86·2	7·2	2·64	—
3	2nd track brake, full on ..	14	,,	93·5	8·4	2·44	—
4	,, ,, ..	14	,,	76·0	6·3	3·26	—
5	,, ,, ..	14	,,	71·0	5·7	3·60	—
6	,, ,, ..	12·5	,,	52·3	6·0	2·82	—
7	,, ,, ..	13	,,	56·5	5·4	3·53	—
8	,, ,, ..	12·5	,,	58·0	5·7	3·22	—
9	3rd track and wheel brakes	14	,,	64·0	6·0	3·42	—
10	,, ,,	12·5	,,	43·5	4·2	4·37	—
11	,, ,,	15·0	1 in 25	—	8·1	2·71	4·00
12	,, ,,	13·0	1 in 14	78·0	6·3	3·15	5·45
13	,, ,,	11·0	1 in 15	37·0	4·4	3·68	5·82
14	,, ,,	15·0	1 in 13	120·0	8·1	2·72	5·20
15	,, ,,	20·0	1 in 13½	208·0	14·4	2·04	4·43
16	,, ,,	16·5	1 in 10	148·0	10·0	2·42	5·64
17	,, ,,	6·5	1 in 8·75	20·75	8·1	1·18	4·86

Tests of Car Control on Gradients.

On 1 in 14, track brake alone, 2nd notch, holds car stationary, even with power on, the wheels slipping.

On 1 in 12, the coasting or 1st notch held car to a steady speed of 12 miles per hour, descending.

On 1 in 9, the coasting notch, with intermittent advances to the 3rd notch, held car to a steady speed of 6·5 miles per hour.

Stops were made on gradients varying from 1 in 25 to 1 in 8·75, and at speeds up to 20 miles per hour, and in every case a good stop was made. Even more striking was the demonstration of ease of control when coasting, a momentary movement of the lever in one or the other direction checking speed, or permitting it to increase promptly and smoothly.

The recorder diagrams have a time scale of three

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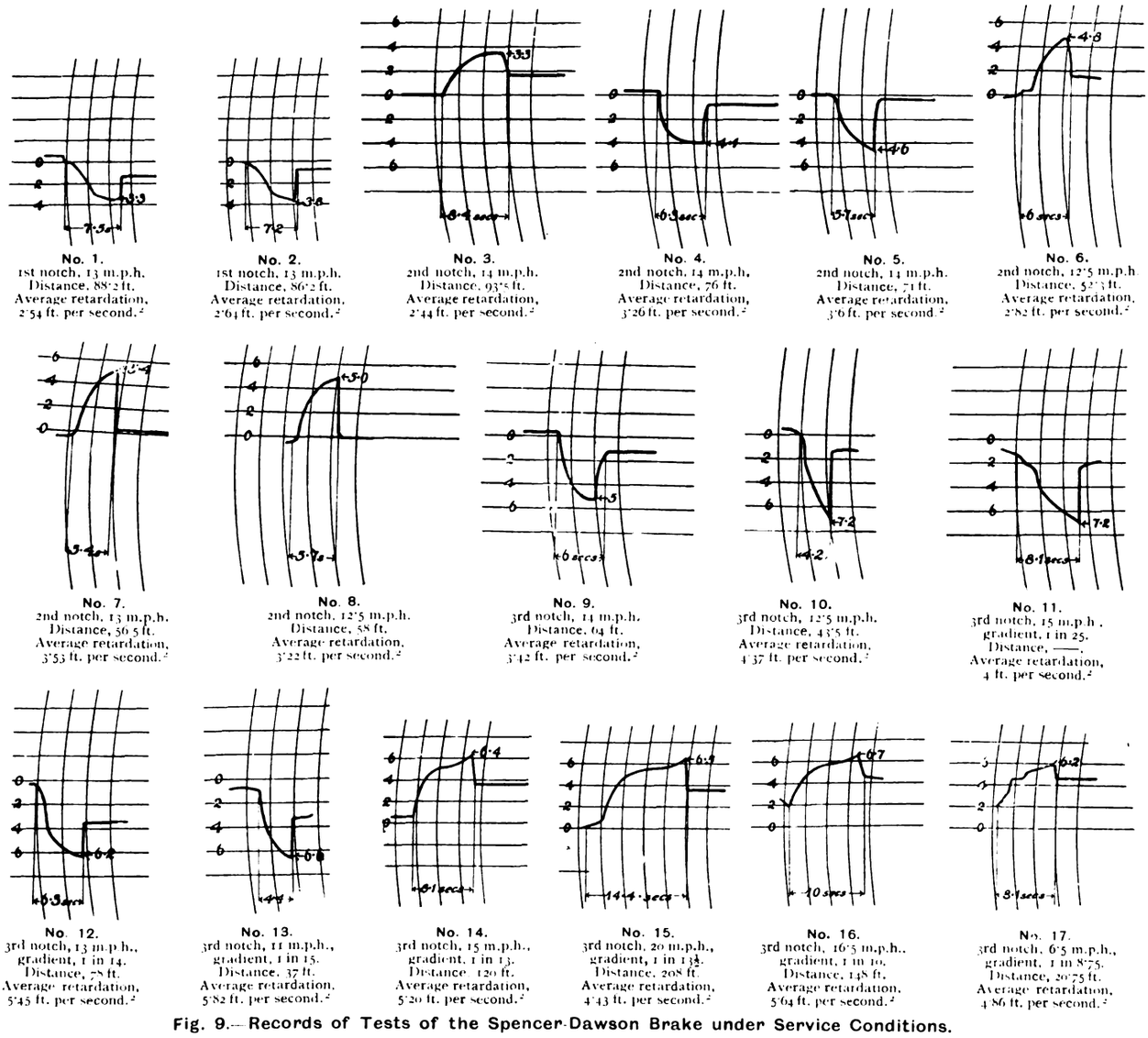
seconds per interval, and an acceleration scale of 2 ft. per second² per interval. Retardation is above or below the zero line according to the direction of the car, and, as stops were made in both directions, some of the diagrams are above and some below. The recording accelerometer is an extremely useful instrument; it gives an analysis of the driving of a car very hard to get at by observational methods, and can be strongly recommended to tramway engineers and managers.

In the present case, observations would give only the average retardation, but the diagrams show its amount throughout the stop, and their shape shows at once if any irregularity, such as greasy rails or skidding wheels, occurs. The rise of the retardation to a maximum at the end of each stop shows better than many clocked or dynamometer tests how the coefficient of friction varies with speed, and a set of such diagrams with blocks of various materials under various rail conditions would have greatly assisted the Brakes Committee already referred to. This is rather a digression, but attention is directed to these records because they show many points of general interest in respect to track brakes.

The description may be supplemented by the definite statement that the Spencer-Dawson brake works well as a service stop brake, as a coasting brake, and as a quick stop or emergency brake; and that its manipulation being simple, readily becomes instinctive. It requires no heavy exertion. It does not interfere with the alternative manual use of the wheel brake; but, of course, if the track brake is on, the wheel brakes are only effective in the measure of the car weight left on the wheels, just as with any other mechanical track brake. The rheostatic brake is also available, and subject to the same limitation as the wheel brake.

Messrs. Spencer and Dawson have certainly worked out a novel form of brake in a thorough way, with considerable patience, and have not sought publicity until they have had ample practical use to justify themselves. The brake is a notable addition to those in use, worthy of careful consideration, likely to be a great favourite with the men, and particularly suitable for use on lines with severe gradients.



No. 1. 1st notch, 13 m.p.h. Distance, 88·2 ft. Average retardation, 2·54 ft. per second.²

No. 2. 1st notch, 13 m.p.h. Distance, 86·2 ft. Average retardation, 2·64 ft. per second.²

No. 3. 2nd notch, 14 m.p.h. Distance, 93·5 ft. Average retardation, 2·44 ft. per second.²

No. 4. 2nd notch, 14 m.p.h. Distance, 76 ft. Average retardation, 3·26 ft. per second.²

No. 5. 2nd notch, 14 m.p.h. Distance, 71 ft. Average retardation, 3·6 ft. per second.²

No. 6. 2nd notch, 12·5 m.p.h. Distance, 52·3 ft. Average retardation, 2·82 ft. per second.²

No. 7. 2nd notch, 13 m.p.h. Distance, 56·5 ft. Average retardation, 3·53 ft. per second.²

No. 8. 2nd notch, 12·5 m.p.h. Distance, 58 ft. Average retardation, 3·22 ft. per second.²

No. 9. 3rd notch, 14 m.p.h. Distance, 64 ft. Average retardation, 3·42 ft. per second.²

No. 10. 3rd notch, 12·5 m.p.h. Distance, 43·5 ft. Average retardation, 4·37 ft. per second.²

No. 11. 3rd notch, 15 m.p.h. gradient, 1 in 25. Distance, ——. Average retardation, 4 ft. per second.²

No. 12. 3rd notch, 13 m.p.h., gradient, 1 in 14. Distance, 78 ft. Average retardation, 5·45 ft. per second.²

No. 13. 3rd notch, 11 m.p.h., gradient, 1 in 15. Distance, 37 ft. Average retardation, 5·82 ft. per second.²

No. 14. 3rd notch, 15 m.p.h., gradient, 1 in 13. Distance 120 ft. Average retardation, 5·20 ft. per second.²

No. 15. 3rd notch, 20 m.p.h., gradient, 1 in 13½. Distance, 208 ft. Average retardation, 4·43 ft. per second.²

No. 16. 3rd notch, 16·5 m.p.h., gradient, 1 in 10. Distance, 148 ft. Average retardation, 5·64 ft. per second.²

No. 17. 3rd notch, 6·5 m.p.h., gradient, 1 in 8·75. Distance, 20·75 ft. Average retardation, 4·86 ft. per second.²

Fig. 9.—Records of Tests of the Spencer-Dawson Brake under Service Conditions.

The Bradford Tramways Committee have ordered all their cars to be fitted with the brake, 50 sets are on order for the Birmingham and 20 sets for the Nottingham Tramways, so that it has already met with some acceptance away from home, and it will be further tested under different local conditions.

The writer has to thank Messrs. Spencer and Dawson for the opportunity of making the tests described, and for their assistance therein; and also Messrs. Morley and Brailsford, of Messrs. Cole, Marchent, and Morley, for allowing inspection of the parts in their works.

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North Western Electrification.

The London and North Western Railway Company are to be congratulated on having at length a line of railway worked by electric traction. True, the West London Railway is not very long, but it represents a beginning, and more is to follow rapidly till about 40 route miles will be under electric operation. Some useful details regarding the West London line will be found in our present issue. It is now quite a number of years since the company announced that they intended to begin a series of experiments with electric traction on a short branch railway in the north of Buckinghamshire. Nothing more was heard of that scheme, and it was not till 1907 that the company promoted a Parliamentary bill for the construction of an electric railway alongside their existing main line from Euston to Watford. The present big scheme now nearing completion, which embraces all the company's London suburban lines and others which they control, is the development of the Euston to Watford idea. A railway company, who hitherto have had very little London suburban traffic and who, indeed, did little to encourage that class of business, are about to enter that field in a determined and energetic way which will benefit the public and themselves, and stir up competing tramways and omnibuses. So far as the West London line by itself is concerned, its present electrification will do little more than stimulate traffic between the north-west of London and stations on the Metropolitan District Railway. When, however, it becomes a part of the completed North Western Company's scheme there will be a different tale to tell.

Ball Bearings.

Gradually the ball bearing is coming into its own. Some makers of these bearings are trying to annex the field of really heavy machinery to the domain of rolling friction. Whatever success may attend their efforts in that direction, it is undoubted that for lighter loads the ball bearing is coming more and more into use. In electric traction it is being employed with favourable results for motor shafts, and to a limited extent for the axles of the road wheels. In petrol motor cars it is practically indispensable, and light machinery of many kinds is coming more and more under its sway. The theoretical advantage of carrying the weight on a series of rolling steel balls, instead of on plain surfaces, has long been recognised, friction being reduced to a minimum. Among the practical difficulties were lubrication and the splitting of balls. The lubrication trouble was a financial one; for although the ball bearings required little oil, it was not easy to prevent it escaping with more rapidity than was consistent with economy. That is being overcome with suitable lubricants, while the fracture of balls is being prevented by the improvement in the steels available. One of the first purposes to which ball bearings were largely applied was for the wheels of bicycles, and painful recollections survive of the troubles which in the early days these bearings gave. The same process is going on in the case of heavier machinery, and before long we may have really heavy loads ball-supported. Complete success in the case of the wheels and axles of tramcars will mean a great deal, because in addition to the reduced friction when running, ball bearings greatly minimise the effort, and consequently the energy consumption at starting from rest. In the innumerable startings of cars after brief stoppages for passengers, the savings in energy will be cumulative and great in their total.

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Assistant Conductors for London.

For inconsistency it would be difficult to surpass the London tramway members of a vehicle workers' union which has come to the front owing to the manner in which the organisers have stirred up dissatisfaction among omnibus men. Of late years the cry upon which public vehicle workers' organisations have harped has been based upon what they term the "speeding up" in their duties. Journey times, however, are not much faster than before the introduction of omnibus competition. Nor have the rival methods of locomotion had the effect of inducing the tramway employees to show greater alertness. Doubtless through the influence of the union, which accepts the money of both classes of worker, the tramway employees have come to look upon the omnibus men as fellow labourers. Unfortunately for the public the drivers of the omnibuses do not reciprocate that feeling to the extent of refraining from using the same stopping places and endangering car passengers. One does not wish for traffic hands to be at work with daggers drawn, but it is incumbent on car crews to speed up their work if they desire to see the tramway undertakings placed in a position to give further concessions to the workers. During the past few years the London County Council have generously met their demands without arbitration, after the adjudications of the Conciliation Board. Not the least valuable relief has been the placing of a conductor upstairs to assist in collecting fares at the starting points, while the institution of return tickets has lightened and expedited the conductor's labours. The Council recently obtained the approval of the Home Office to employ youths of over 16 years of age as assistant conductors. The main objects in view are to further lighten the conductor's work, to secure the greater safety of the passengers, and to enable a better look-out to be kept. This would be accomplished by keeping the youth on the platform to take charge of the bell, while on routes where there is trolley as well as conduit traction, his duties would also embrace the work for which lads have been found useful on provincial tramways. Unfortunately the extremists among the union men are taking a short-sighted view of the Council's attitude; probably for the want of an official explanation as to the reasons for the innovation, which ought to be welcomed as a relief for alleged "speeding up." One may question conductor after conductor as to the grounds of their opposition, only to find them declare that the proposal is the thin end of the wedge to introduce cheap labour and to oust men who are increasing in years. No time should be lost by the Council in assuring the men that their fears are not justified.

Car Control Without Resistances.

There are very few tramcars in this country with four-motor equipments, but tramway engineers will nevertheless be interested in a new type which has been adopted as standard in Pittsburg, Penn. In the case of electric locomotives hauling heavy trains on railways, four motors, one on each axle, are familiar enough, and the usual plan is to arrange them in two groups of two motors each, the groups being put in series or parallel as required, and the usual resistances being employed for starting. In the case of the Pittsburg car, the original idea was to get a low floor, so as to reduce the difficulty of the passenger in entering and leaving the car. This idea is now fairly wide-spread in practice in America. To carry it a step further, the diameter of the car wheels has been reduced to 24 in., and no doubt owing to the smaller space available, correspondingly smaller motors have been adopted. To get the necessary power in these circumstances four motors are employed, one on each axle, all eight wheels being thus driving wheels. Then the notion was evolved of doing away with the use of all resistances at starting (except a small resistance used momentarily to prevent jar as the car begins to move) by having the four motors in series to begin with, and then passing them through various stages until they are all in parallel. Among the peculiarities of this arrangement is that in one of the positions of the controller two of the motors are running idle, being short-circuited for the purpose. What appears to be the most objectionable feature of the arrangement, however, is that at one stage of notching up—and it is more than a transition stage—two of the motors are in series, one is running idle, and one is running on the full line voltage. With this arrangement the loading is very unequal, the motor on full voltage doing much more work than the other two. Though

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this grouping does not last long during an acceleration, it cannot be regarded as a desirable feature. This method of driving requires a master controller and a switch group with eight unit switches. Whatever may be the objections to the arrangement, it is claimed that a saving of from 10½ to 12 per cent. in current consumption is effected, as compared with the ordinary method of control.

THE USE OF METERS ON TRAMCARS.

To the Editor of the Tramway and Railway World.

The issue of February 12 of The Tramway and Railway World contains an interesting article by M. Delthil on the "Use of Meters on Tramcars." With some of his remarks, however, I venture to disagree. M. Delthil states: "The ampere-hour meters register the merit of the motormen just as exactly as the watt-hour meters, provided that the motormen work under the same conditions and with the same potential."

However, this is only theoretical, as when operating a tramway system potential differences of 20-30 per cent. must be taken into consideration on different times and parts of the lines. Therefore, measurement of energy by ampere-hour meters cannot give reliable results.

Of course, the real purpose, which is the economical consumption of energy of the whole system, can be reached with ampere-hour meters as well as with watt-hour meters, but the same could be said about time meters. Besides the low price and the low cost of maintenance, the latter have the great advantage of forcing the motormen to the theoretically most economical way of driving, *i.e.*, with high accelerations and long run-outs. They have the disadvantage of not offering a reliable way for judging the efficiency of each individual motorman, and of tempting the men to start with too high currents. This can be prevented by fixing a minimum limit, by the automatic switches, and by a constant control through inspectors in civil clothes, who perform their duty not on the platform, but unseen by the motorman inside of the car.

Especially for small companies, the time meters are preferable, owing to the very little chance of injuries. To test the efficiency of the motormen the watt-hour meter answers the purpose better than the ampere-hour meter, while the ampere-hour meter gives better results than the time meter.

The disadvantages of watt-hour meters in comparison to ampere-hour meters are by far not as important as M. Delthil states. The Hague Tramway Company, *e.g.*, has had in operation 180 watt-hour meters for over seven years. Damage caused by the revolving disc never occurred. Most of the injuries are caused through dirty or burnt commutators and brushes or dirty bearings, to which injuries ampere-hour meters are exposed just as well. Such injuries as happen more especially to the watt-hour meters, *i.e.*, insulating faults, etc., occur but comparatively rarely. The meters are now over seven years old, and are still in very good condition; so their life certainly will not be shorter than that of ampere-hour meters, which M. Delthil mentions to be 5-10 years.

M. Delthil states that the annual cost of up-keep is 10-12 frs. per ampere-hour meter. Each meter in use by the Hague Tramway Company has been in the laboratory of the company during the last year on the average 5·1 times a year, at a cost of 4·45 frs. per meter per annum. The price paid for these watt-hour meters has been 136 frs. each, which is only a little higher than the price of ampere-hour meters (125 frs.).

Hence it follows that the watt-hour meters can compete very well with the ampere-hour meters, and in view of the fact that they register the "real" consumption of energy they are superior to the latter in a very important respect.

The bonus system of the Hague Tramway Company takes into consideration the influence on the consumption of energy on the different lines, the time of the day and the year, the weather, and other conditions.

It would take too much space to describe the whole system in detail, but in a few words it comes down to this. The men are classified every quarter of a year, and for each trimester is fixed a maximum consumption of energy per car-kilometre, measured at the power plant. If this limit is surpassed no bonus at all is paid, if not all motormen participating in the bonus receive the same premium (5 frs. per quarter of a year), and only the very unsatisfactory motormen are excluded. The names of the latter are published, also the names of those motormen who were not quite satisfactory, but who do not belong to the excluded class. Those who have been excluded are reinstructed during one day by an economical driver. The publishing of the names and the reinstruction give especially very good results. Those who belong to the class of the very efficient and economical motormen receive an extra annual bonus of 5 frs. each. The instructors and supervisors receive a bonus in proportion to the number of watt-hours economised, and a maximum of 80 frs. per trimester each. The total amount of the bonuses paid out is about 6,000 frs. per year. The annual cost of administration is about 13·50 frs. per meter.

The whole system works most excellently, as the annual average in 1913 was only 463·3 watt-hours per car-kilometre measured at the power-station. In the calculation of this average the trailer-kilometres are reduced to motor-car-kilometres with coefficients according to the type of trailer (the average of 1 trailer-kilometre is about 0·6 motor-car-kilometre).

This very low consumption of energy is the result of tests how to work the cars economically, which tests were taken on a large scale some years ago, and of the constant supervising of the motormen by the meters as well as through inspectors. It must be mentioned that the average in 1914 will be about 5 per cent. lower, owing to substitution of carbon lamps by metallic filament ones. Moreover, for the last months a study of the gearing of motor cars is being made. Tests have shown that by changing the gearing of one type of cars the consumption of energy of these cars can be reduced by 5 to 13 per cent., according to the lines on which they are in operation. This means a reduction of the whole consumption of energy by about 4·6 per cent. So within a short space of time it may be expected to bring the average down to 463·3—9·6 per cent. = 419 watt-hours per car-kilometre measured at the power plant. The weight of the motor cars when a one-third part of the seats are occupied is about 10,000 kg.

The remarkably high consumption of energy shown by the diagram on page 111 (in 1912 an average of 1·218 watt-hours per car-kilometre) seems to indicate that the diagram is to be understood as to give watt-hours per car-mile, or otherwise that this company works under very extraordinary conditions.

P. M. Montijn *(Electrical Engineer)*,
Chief Engineer of the Workshops and Rolling Stock Department of the Hague Tramway Company.

[The figures were taken from M. Delthil's paper.—Ed. T. & R.W.]

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MANGANESE STEEL FOR RAILWAY PERMANENT WAY.

For over 20 years Hadfields, Limited, have been supplying manganese steel rolled to various sections and also as castings and forgings. Manganese steel, which is the invention of Sir Robert Hadfield, and of which Hadfields, Limited, are the original makers, is remarkable for its great hardness and extreme toughness. It is so hard that it cannot be machined, either by turning or planing: but it is not brittle. On the contrary it can be bent double when cold without showing signs of fracture. Figs. 1 and 2 illustrate the extraordinary hardness and toughness of Hadfield's patent "Era" manganese steel. Its special wear-resisting properties have rendered it particularly suitable for crossings and curved rails, and it has been largely adopted for these parts on electric tramways. As in tramways, so in railway work, the most pressing problem facing engineers to-day is that of the efficient maintenance of the permanent way. The conditions prevailing on British railways demand improvements in the construction of the track. On the steam railways locomotives are heavier, carrying capacity of the rolling stock has been increased, train service is more frequent, and the speed of the trains has been greatly accelerated.

On electric railways it is acknowledged that the working conditions are generally much more severe than in the most exacting service on steam railways. This is due to the train service being almost continuous, to the fact that the wheels are smaller in diameter than on steam railways, and to the increased number of driving wheels per train. The rapid acceleration and stoppage of the trains is also a cause of severe wear.

Hadfields, Limited, have always taken a leading part in the application of special steels to railway purposes.

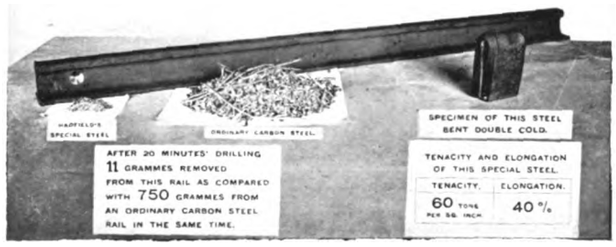
SPECIMEN OF THIS STEEL BENT DOUBLE COLD.
AFTER 20 MINUTES' DRILLING 11 GRAMMES REMOVED FROM THIS RAIL AS COMPARED WITH 750 GRAMMES FROM AN ORDINARY CARBON STEEL RAIL IN THE SAME TIME.
TENACITY AND ELONGATION OF THIS SPECIAL STEEL.
TENACITY. ELONGATION.
60 TONS PER SQ. INCH
40 %

Fig. 1.—Rolled Rail of Hadfield's Special Steel.

Fig. 3.—100 lb. Rail of Era Non-Magnetic Steel.

As early as 1904 they had successfully rolled for them a light Vignoles rail, and they continued the experiments in this direction until in 1907 a large number of rails were rolled and supplied to the Metropolitan Electric Railway of Paris. These rails were of the Vignoles section weighing 100 lb. per yard (Fig. 3). Hadfield's patent rolled "Era" manganese steel rails have also been supplied in 30 ft. lengths to the following, viz.:

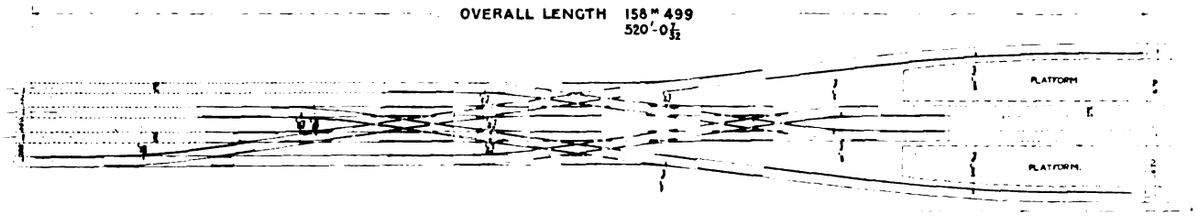

Fig. 4.—Diagram of Part of Special Work at Primera Junta Station—Buenos Ayres Subway.

Central London Railway, B.S. bull head section, 90 lb. per yard;
South African Railways, B.S. Vignoles section, 80 lb. per yard;
New South Wales Government Railways, B.S. Vignoles section, 80 lb. per yard and 60 lb. per yard.
Electric subway of Buenos Ayres, B.S. bull head section, 90 lb. per yard.

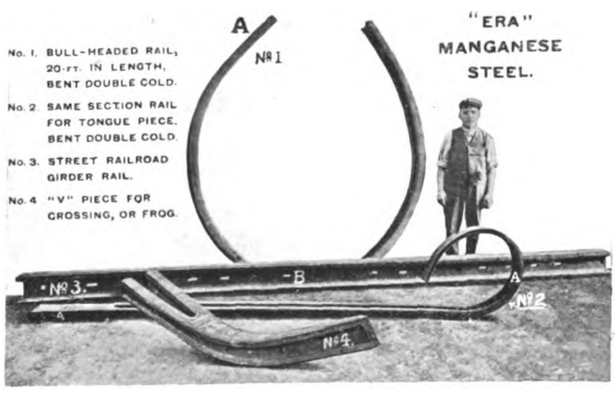

Fig. 2.—Specimen Rails of Era Manganese Steel.

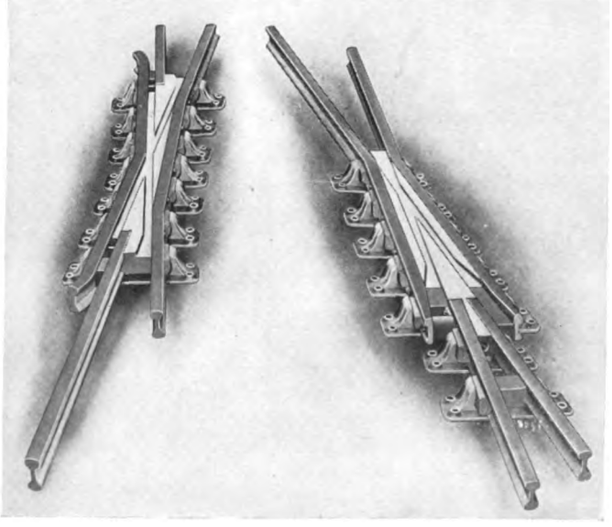

Fig. 5.—Crossing of Era Manganese Steel.

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In all, Hadfields have supplied to date hundreds of tons of rolled "Era" manganese steel rails of various sections.

In addition to supplying rails in this special steel, Hadfields, Limited, also design and construct complete lay-outs. No matter how large and extensive a junction may be, it is neither too big nor too intricate for Hadfields to undertake. An illustration of what the firm can do in this direction is given in Fig. 6, which shows the permanent way for the Primera Junta station of the electric subway lines in Buenos Ayres. This lay-out is the largest piece of manganese steel railway permanent way in the world. It is specially interesting to British railway engineers, inasmuch as it is after the same design as the standard adopted on British railways, the rails being of the B.S. bull head section, 90 lb. per yard, secure in cast-iron chairs with oak keys. The rails and the crossings are of Hadfield's patent "Era" manganese steel, the former being rolled in lengths of 30 ft. each. The following are some of the details of this extensive and complicated lay-out: Total length, 520 ft.; weight, 160 tons (which includes approximately 90 tons of rolled "Era" manganese steel rails); number of standard single crossings, 16; special single crossings, 4; special compound crossings, 8.

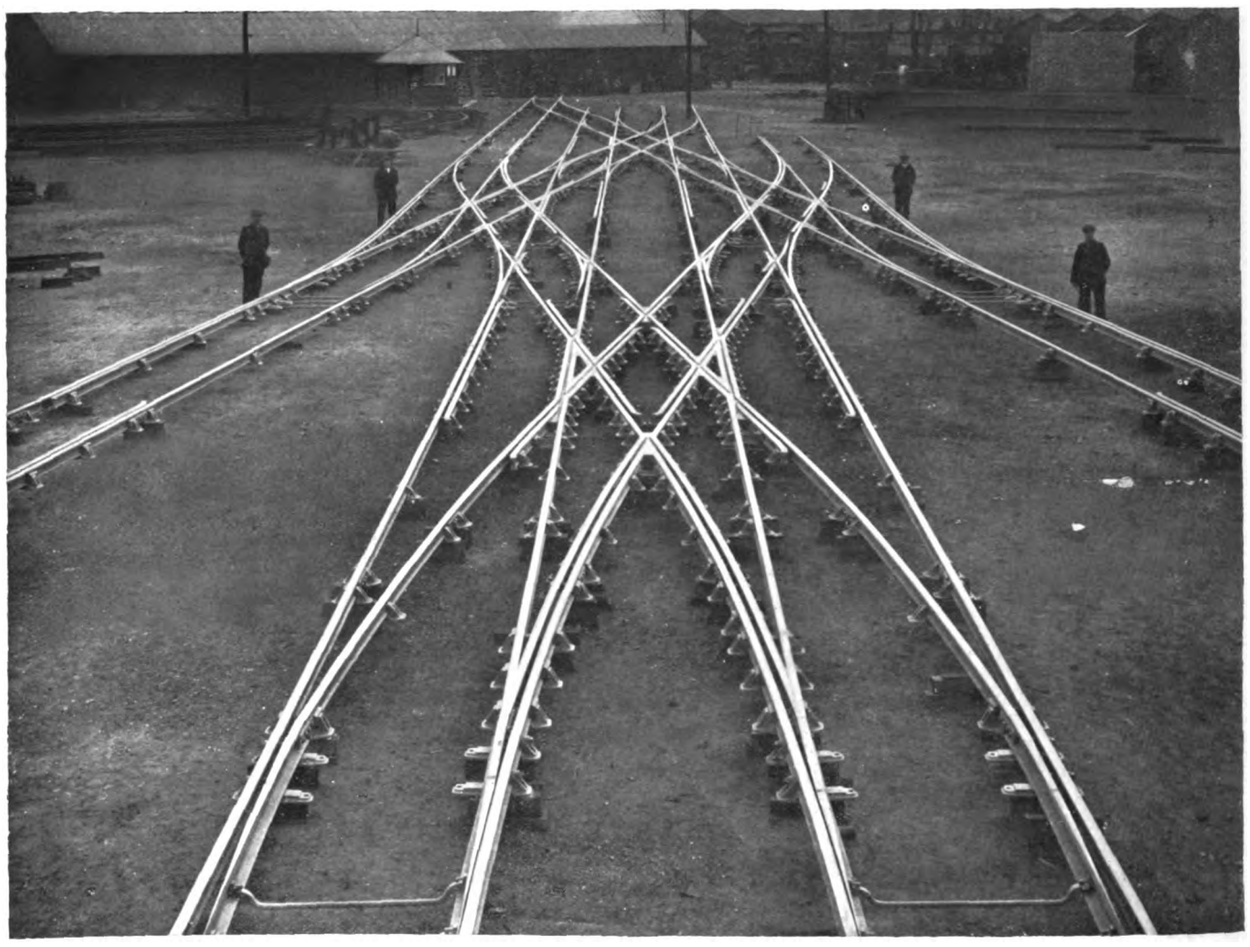

Fig. 6.—Lay-out in Era Manganese Steel for Primera Junta Station—Buenos Ayres Electric Subway.

The crossings are of a special patented design. They also are made throughout of "Era" manganese steel, but are reinforced with a cast centre, bound and securely held in position by rolled rails. Fig. 5 clearly shows the type of construction, which is absolutely reliable. The centre pieces being castings made from specially prepared patterns, and carefully finished to templates, perfect accuracy and alignment are attainable, which cannot suffer disturbance under working conditions.

THE "BRITNIC" (NICLAUSSE) STEAM GENERATING EQUIPMENT AT SOUTHEND-ON-SEA ELECTRICITY WORKS.

Of all the up-to-date electric light and tramway undertakings, that of the county borough of Southend-on-Sea ranks amongst the most progressive. The engineer and manager, Mr. Robert Birkett, is a man of marked originality and having the courage of his convictions by no means considers himself bound to stereotyped practice. It is not surprising, therefore, to find that he has developed unique methods in, for instance, charging for the supply of electricity for lighting and power, and in analysing his traffic problems. His originality is not confined to methods of management, for in the arrangement and equipment of his power plant he boldly explores regions wherein others fear to tread—and he is obviously justified, since his departments have continued to show remarkable advances year after year. Ten years ago, the electric light and tramway undertakings of Southend were derelict, but the last year's returns just published show a profit of no less than £19,000. In an early issue we hope to describe the tramway system, which is extremely interesting in many important respects, but in this article we propose to deal only with the power-station and equipment.

The power house and tramway depot now monopolise the whole of what was until recently the Corporation Yard, comprising at the London Road End the works department of the borough surveyor and engineer, who has lately had to acquire new premises at Southchurch to make room for the further development of Mr.

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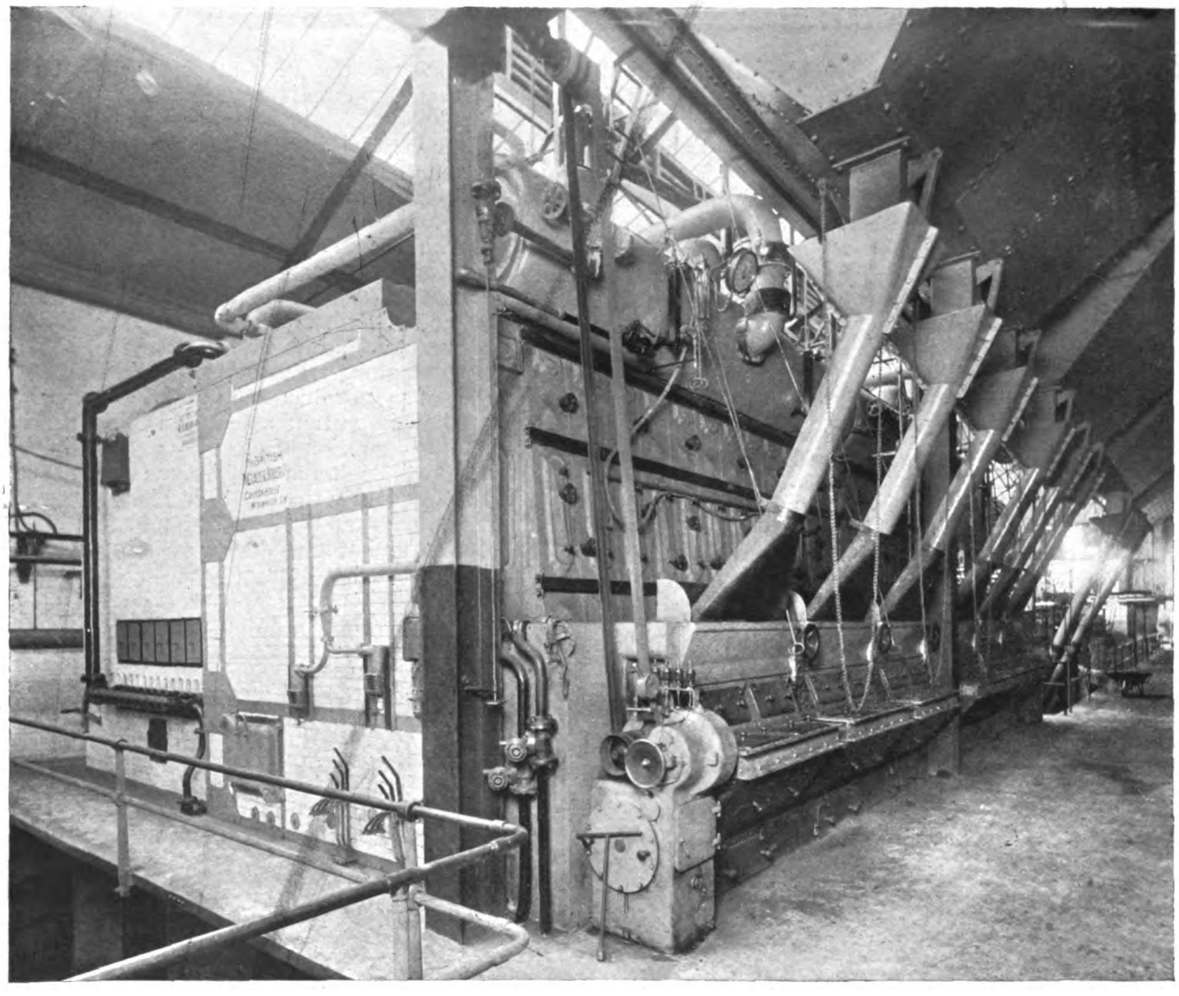
Birkett's departments. The engine room at present contains six Belliss, one Howden, and two Willans engines operating on a very large evaporative condenser (we believe the largest of its kind in the world). Two new 500-KW. Belliss sets have recently been set to work, and two new sub-stations are being built to accommodate five Belliss-Diesel engines—two four-crank engines at Thorpe Bay, and three at Leigh—whilst only recently the storage battery at the power-station has had to be augmented by a large new battery with boosters located in a new sub-station at Chalkwell Park.

It is in the boiler house, however, that the most interesting developments have recently taken place. Here a pair of large "Britnic" (British Niclausse)

Pressure	.. ..	160 lb. per sq. in. (boilers built for 225 lb. and tested to 360 lb.)
Capacity & superheat		(25,000 lb. from and at normal) Superheat (35,000 lb. „ „ overload) 150 deg. F.
Boiler H.S.	.. ..	3,700 sq. ft. outside tubes only, neglecting headers.
		1,700 sq. ft. inner tubes (circulating).
Superheater H.S.	..	1,076 sq. ft.
Headers and tubes	..	20 headers, each having 21 evaporating tubes and one cleaning tube plug.
		Size of tubes, 80 mm. by 10 ft. 1¾ in. long.
Drum	.. .. ..	1 metre dia. by 17 ft. 1½ in. long.
Space	.. .. ..	Battery of two boilers, 36 ft. 6 in. by 15 ft. 6 in. long.
Thermal efficiency	..	80 per cent.

The new Niclausse equipment is shown in the accompanying illustration. The depth of the Niclausse



The "Britnic" (Niclausse) Steam Generating Equipment at Southend-on-Sea.

boilers, complete with superheaters and mechanical stokers of the same make, each with a 192 pipe Green's economiser, have been installed in the place of three Paxman "Economic" boilers; whilst the existing two Babcock and Wilcox and two Stirling boilers for the time being have been shut down, the whole load being now handled by the new Niclausse equipment.

The installation has been carried out under the contract awarded to the British Niclausse Boiler Company, Limited, Caxton House, Westminster. This contract included the work of removing the existing boilers and economisers when the necessity for further extension of the boiler plant arises. The particulars of these Niclausse units are as follow:

plant, including the economisers located at the rear of the boilers, is but little greater than that of the present boilers alone. The economisers of the latter had to be erected alongside, as the width of the boiler house was insufficient to permit of their being placed otherwise.

The Niclausse boilers are raised above the old boiler house floor level about 8 ft., making the firing floor level with the yard and adjacent engine room. Great advantage has been taken of this in arranging the new main flue under the economisers and in the provision of superior means for handling the ashes. To this end, the Niclausse stoker is exceptionally well designed, since it is fitted with hoppers under the grate to trap in separate compartments all green fuel and fine ash shaken

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through the bars, the clinkers being delivered continuously over the end of the grate into a brick-lined chamber at the back, and are thence periodically discharged to ash wagons run along the basement. The Niclausse stoker operates with low-pressure forced draft, fans being placed in the basement under the firing floor, and delivering through ducts to the hoppers under the grate. The special feature of this stoker is that the air supply is regulated in correct proportions to the different zones of the fuel bed, and levers operated from the side of the furnace control registers admitting or shutting off the air supply to the different compartments of the hoppers under the grate.

The furnace is divided into three sections along its width, and comprises a number of bearers carrying the fire bars, which are made up in thin sections about a foot long and set in the bearers five abreast. A very fine air distribution through the fuel bed is thus obtained. The bearers are caused to move intermittently and successively in a longitudinal direction, and being inclined about 10 deg. the fuel is gradually fed forward after entering from the hoppers at thickness regulated by a movable shutter controlled by the fireman.

The bar movement is effected by means of a slowly rotating shaft mounted with hard-steel trip pieces engaging with steel blocks mounted on the bearer heads. The speed of the stoker can be varied over a range of from one to six revolutions per minute by change gears, and any desired intermediate speed is given by speed regulation of the electric driving motor. Thus the stoker is readily adjustable as to thickness of fire, pressure of air supply, point of air supply, and speed of the grate.

It is claimed that the stoker is capable of burning with most satisfactory results any fuel from the richest to the poorest grades. At Southend, Midland fuel having 42 per cent. volatiles is being used, whilst in South Wales low-grade coals having only 9 per cent. volatiles and about 30 per cent. ash are found capable of being handled with excellent results. Even coke breeze is being successfully consumed by these stokers.

We will now allude briefly to the special features of the modern Niclausse boiler which naturally has been very greatly improved since it was originally introduced into this country about 12 years ago.

The "Britnic" boiler, of which there are over 400,000 H.P. in service, comprises a compact bunch of short straight tubes connected at one end to a drum by a single row of headers, the tubes being closed at the other end. Both the headers and the tubes are perfectly free to expand. The headers are divided into two compartments, and the tubes are fitted with an internal tube, so that the water flowing down the front side of the headers feeds, by means of the internal tube, the back end of the evaporating tube, which delivers its steam and hot water to the drum, *via* the rear compartment of the header. This excellent circulating arrangement is, moreover, perfected by the very simple method adopted to ensure the feed water first entering the upper rows of tubes, where it is heated to steam temperature, and thereby purified, so that no depositing of impurities can subsequently take place. The hot purified feed is afterwards delivered to the lower rows of evaporating tubes, *i.e.*, those nearest the furnace, and, in consequence, very high evaporative duty is obtained without the slightest possibility of tube troubles. Any impurities contained in the feed water are largely deposited in the detartarising trough located in the drum, whence they can be readily ejected by the blow-off. The remainder of the impurities that cannot be so extracted are harmlessly deposited in the upper tubes, where they are surrounded only by exit gases at comparatively low temperatures. These deposits are soft and inactive, and can be readily removed by withdrawing the inner tube and, if necessary, the outer tube completely, an act of the simplest character.

Maintenance expenses with the "Britnic" boiler are, it is claimed, practically reduced to a minimum. Hundreds of these boilers, after having been in daily operation for upwards of 15 years, have never required a new tube. It is, however, not only in point of tube maintenance that the boilers have evident advantages, for brickwork rectifications are also negligible items. This is because the brickwork is of a very much less quantity than in other types of boilers of the same capacity. Owing to the fact that the "Britnic" boiler is remarkably compact, efficient, and substantial in every way, greater capacity can be provided on a given space than is possible with other boilers, whilst the headroom is also very much less, and therefore a cheaper type of boiler house is ensured.

Another most important feature of the "Britnic" boiler is that the exterior surface of the tubes can always be kept perfectly clean, and, therefore, in the highest state of efficiency. The operation of cleaning a boiler even of large capacity occupies only about 10 minutes, and is usually done once a day. To effect this important duty, the fireman need not open a single door, he merely uses a lance, inserted between the tubes through small holes in the boiler front; these holes being closed with little caps. The lance is connected and fed through a flexible hose with steam at boiler pressure, and its use, by passing it backwards and forwards amongst the tubes, effectively dissipates any deposit of soot or dust upon them. Engineers will appreciate how important a feature this is, bearing in mind that the operation of cleaning water-tube boilers is generally so difficult and troublesome that it is carried out far less frequently than is desirable.

It will be seen that the installation at Southend is of great interest, and the results over a longer period will be awaited with hopeful curiosity by power-station engineers upon whom the increasing cost of operation presses with ever growing intensity.

CANADIAN ELECTRIC RAILWAYS.

A report of the department of railways and canals gives the number of miles, computed as single track, of Canadian electric railways at 1,869·6, as compared with 1,723·51 the previous year. The *Electrical News*, however, states that the figures scarcely do justice to the electric railway expansion in Canada during the past year. The Government report has not taken cognisance of some 36 miles of new road in Vancouver and Victoria, 20 miles in Edmonton, and considerable extensions in Ottawa, Port Arthur, Regina, etc. Neither does the Government make any report on the Brandon municipal system, the Edmonton interurban railway, the Saskatoon municipal, or Toronto municipal systems. Our contemporary states that the year 1913 constituted a record in electric railway developments, with the prospects for the coming year even brighter.

SCHEMES FOR UNDERGROUND RAILWAYS.

CHICAGO.—It is reported that Norton Griffiths and Company, of London, have offered, in conjunction with W. H. Brown and Company, of New York, to organise an operating company, with $25,000,000 capital, to build a system of underground railways in Chicago. It is proposed that 55 per cent. of the profits should go to the city and 45 per cent. to the company. The fare is not to exceed five cents.

LACROZE.—J. G. White and Company have presented to the Argentine Government for approval a scheme for the construction of an underground railway in Lacroze. The total length of the tunnel will be just over 10 km.

VIENNA.—A proposal is to be submitted by French companies for the construction of an underground railway in Vienna. In the event of the promoters not being able to raise a loan in Paris, it is stated that German and Austrian companies will take up the scheme.

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PECKHAM LONG WHEEL BASE RADIAL TRUCKS AS DESIGNED FOR LIVERPOOL DOUBLE-STAIRCASE CARS.

In our issue of February 6 last a full description was given of the 32-ft. double-deck cars supplied to the Southend Corporation Tramways, which were mounted on the long wheel base trucks designed by Mr. Edgar Peckham. It was then stated that the general manager of the Southend Tramways had spoken in terms of the highest praise of the operation of these trucks. With the aid of the improvements embodied in the trucks supplied to Southend by the Peckham Truck Company, and with the additional advantages given by the Peckham patent long wheel base, radial axle trucks, Mr. C. W. Mallins, general manager of the Liverpool Corporation Tramways, has been enabled to carry still further the new design of single-truck car which he introduced into service in that city in the early part of the year 1912. The chief distinguishing feature of that car was the double staircase on each platform for the purpose of facilitating the loading and unloading. Descriptions and illustrations of the design were given in THE TRAMWAY AND RAILWAY WORLD of April 4 and November 12, 1912, when it was mentioned that the car provided seating accommodation for 26 passengers inside and 46 outside.

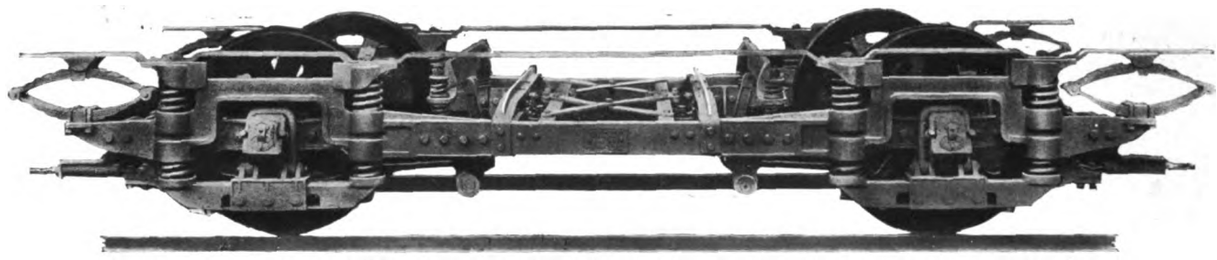

Fig. 1.—Peckham Radial Truck, RE-2—Wheel Base, 9 ft.; Effective Wheel Base, 12 ft.

The new bodies seat 80 persons, or eight above the accommodation of the ordinary cars. Retaining the notable improvement of the double staircase, Mr. Mallins has also secured more commodious vestibules, and very wide aisles on both decks, while there is ample space between the transverse seats. One body is fitted with transverse seats, and the other with longitudinal seats. The longitudinal seated car is much more roomy than the ordinary longitudinal seated cars hitherto used at Liverpool. The Tramways Committee have decided to build about equal numbers of cars with the transverse and longitudinal seats.

The length of the Mallins car as originally constructed was 26 ft. 6 in. overall, with a 16 ft. body and 5 ft. 3 in. platform. The length of the improved car is 31 ft. overall, with 18 ft. body and 6 ft. 6 in. platform. To enable the length of the car to be increased to 31 ft., Mr. Peckham designed, and the Peckham Truck Company, of Queen Anne's Chambers, Westminster, S.W., supplied, two radial trucks with 9-ft. wheel base and 12-ft. spring support of side frames ("effective wheel base"). These trucks, as shown in Figs. 1 to 4, carry the 31-ft. cars without galloping or side swings, and take the curves smoothly.

Figs. 1 and 3 show the radial truck of the RE-2 type with a sub-truck as shown and described in our issue of February 6, but with some modifications to adapt it to the Mallins car.

Figs. 2 and 4 show a Peckham R-24 radial-axle truck without a sub-truck, also adapted to suit a Mallins car. These trucks as designed can be used with 16, 18, or 20 ft. double-decked cars.

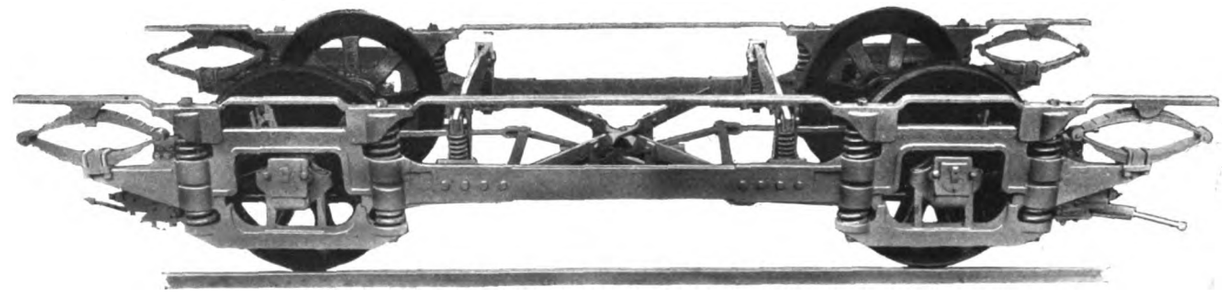

Fig. 2.—Peckham Radial-Axle Truck, R-24—Wheel Base, 9 ft.; Effective Wheel Base, 12 ft.

DAIMLER OMNIBUSES AT OXFORD.

The single-deck omnibus illustrated in our issue of April 9 is one of four of the same type which the Daimler Company of Coventry have recently supplied for service in Oxford. The chassis is the standard Daimler omnibus model, with "silent" Knight engine and chain gear box. The bodies are of special construction, and were built by Christopher Dodson, Limited. They are designed to seat 25 passengers, all inside, and the seats all face forward. Entrance is obtained at the back of the vehicle, where a completely-closed-in vestibule affords protection from the wind and weather, both for the conductor and the passengers on the end seats. Swing type ventilators are fitted round the top, and the door in the vestibule back has a drop window. The outstanding feature in the construction of the bodies is the use of Dodson's patent reinforced steel pillar plates and cross bars. The patent cross bars were specially designed for the extra wide bodies such as here illustrated. The vehicles are handsomely upholstered in red leather, and are fitted throughout with the C.A.V. electric lighting equipment. The overall length of the omnibuses is 21 ft., width 7 ft. 2 in., while the inside head room is 8 ft. clear.

From Maidstone to Hastings.—An enterprising firm at Maidstone on April 8 inaugurated a daily motor service between that town, Hawkhurst, Robertsbridge, Battle, and Hastings, at a return fare of 4s. 6d. for the full journey. The route being a direct one, the distance is less than by railway, while the fare gives a considerable saving. The single journey occupies three hours.

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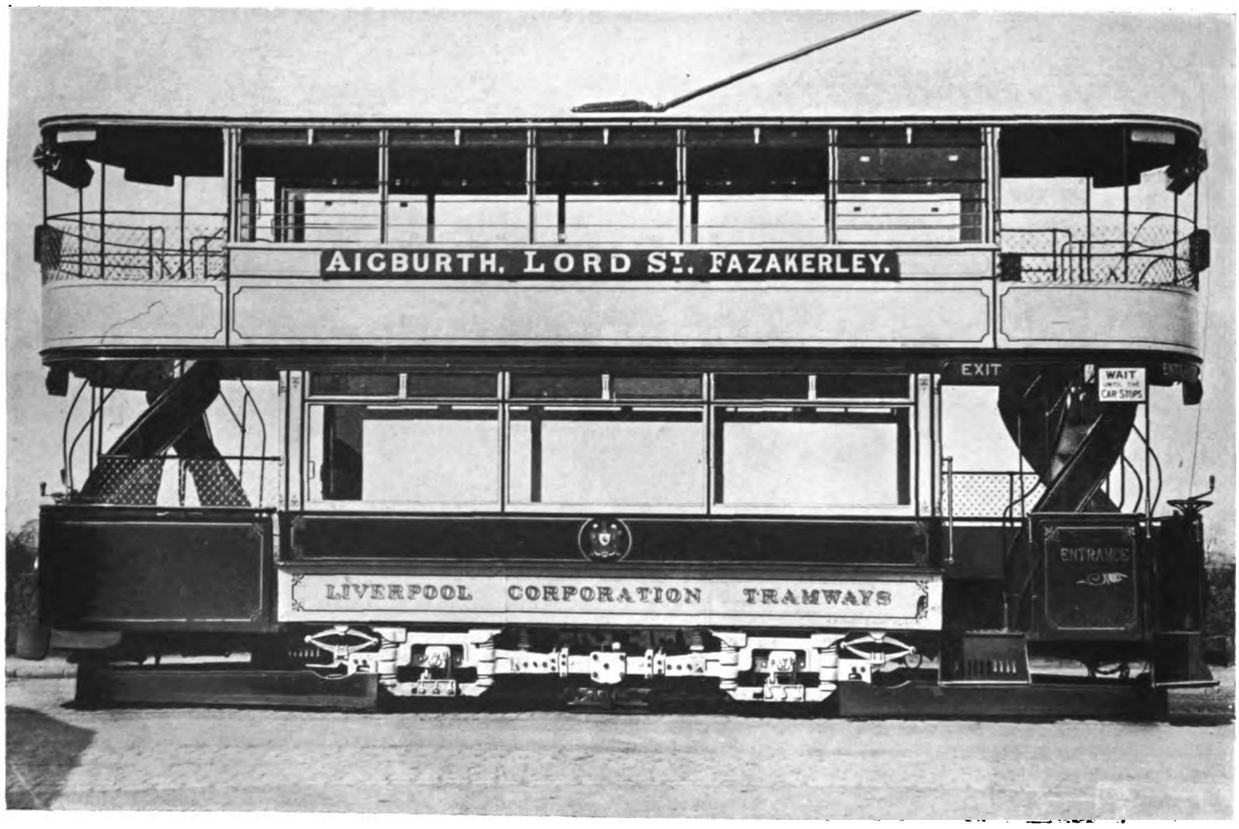

Fig. 3.—Mallins Double-Staircase Car Mounted upon a Peckham RE-2 Radial Truck.

Fig. 4.—Mallins Double-Staircase Car Mounted upon a Peckham Radial-Axle R-24 Truck.

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BUENOS AYRES WESTERN RAILWAY ELECTRIFICATION.

A Great Electric Cable Contract.

The electrification of the Buenos Ayres Western Railway suburban system is probably the largest railway electrification scheme yet undertaken, and a few particulars of the cables may be of interest to readers. The contract for supplying and laying the whole of the cables in connection with the undertaking has been secured by W. T. Henley's Telegraph Works Company, Limited, which firm, it will be remembered, also secured a similar contract in connection with the electrification of the suburban lines of the Central Argentine Railway, the cables for this latter undertaking being now in course of installation.

The Buenos Ayres Western Railway system will be operated at a pressure of 800 volts direct current. Energy will be generated at 2,500 volts, 25 cycles per second, and transformed to 20,000 volts by means of three single-phase step-up transformers connected directly to the terminals of each generator. This will then be transmitted to five sub-stations, the feeders to two sub-stations being run in duplicate. These sub-stations will be equipped with rotary converters for transforming the three-phase current to continuous current at the pressure of 800 volts, and from there connection will be made to the conductor rails. The principal cable item is one of approximately 116,000 metres of ·10 sq. in. three-core, split conductor, paper insulated, lead covered, and steel wire armoured cable, which is to be used for feeders at the working pressure of 20,000 volts. This cable will be tested after 24 hours' immersion in water up to 50,000 volts, and a sample piece cut from any drum selected by the consulting engineers is to withstand a test pressure of 100,000 volts. It will be laid direct in the ground at a depth of one metre, further protection from mechanical damage being afforded by 2-in. creosoted boards being placed over the cables. At cross culverts and level crossings the cables will be drawn through cast-iron pipes, and where they run across bridges they will be hung on racks and protected from the suns rays by sheet iron. All joints will be of the vacuum type in gun-metal sleeves, similar to those adopted for the Central Argentine Railway cable.

The track cable consists of about 17,000 metres of single-core, paper-insulated cable, part of which will be lead-covered and single-wire armoured, and part sheathed with vulcanised bitumen, taped, braided, and laid solid in fibre troughing. This track cable will, of course, feed the conductor rails and connect across breaks in the rails at level crossings, junctions, etc.

The contract also includes the supplying and laying of about 58,000 metres of dry-core, lead-covered, and wire-armoured telephone cable, and, of course, the necessary terminal boxes, pillars, telephone apparatus and accessories, of which a very large quantity will be wanted. This is the largest contract that has ever been placed for any power cable installation, and following as it does in the wake of the Central Argentine Railway contract secured by the same firm, which at the time it was placed was a record contract, enables Henley's to take a great position as suppliers of extra high-tension electric cables. Moreover, the portion of the work that has been put in hand by the railway company represents a part only of the complete scheme, which is divided into two sections, section A, of which the contract under notice consists, being the larger of the two. If the railway company eventually decide to carry out the complete scheme the value of the contract will be very considerably enhanced.

The work is to be completed in 16 months, and it will call for the services of a large number of engineers, jointers, etc. Messrs. Livesey, Son, and Henderson and Messrs. Merz and McLellan are the consulting engineers for the complete scheme.

R.E.T. RAILLESS CARS AT BOKSBURG.

In March last a railless trolley car system, installed for the Boksburg Municipality by the R.E.T. Construction Company, Limited, Finsbury Pavement House, London, E.C., was opened amid general rejoicing. This is the first installation in the Transvaal, and the occasion was made a gala day.

Sir George Farrar, one of the mining magnates, who had promised to officiate, was unavoidably absent, and his place was taken by Miss Farrar, who was met by a procession of the Imperial Light Horse, the Cadet Corps, and the Fire Brigade. The Mayor (Councillor J. C. Cook) welcomed Miss Farrar, and said he was sure that the railless car service would give a great impetus to the social and business life of the town, which had hitherto been impeded owing to its scattered area. He hoped that the merchants and business people would now feel the improvement, and recover from the terrible depression. As for the humble omnibus drivers, he trusted they would seek other venues and find spheres of useful occupation.

Thanks were accorded by his Worship to the South African Railway Administration for the courteous manner in which they had settled the crossing question, and to the telephone department for altering their wires to suit the trolley line requirements. In conclusion, the Mayor said he had no doubt that other municipalities would soon adopt a similar service. Miss Farrar formally declared the system open, and the first car was then started, breaking the ribbons spanning the roadway. A large assembly was conveyed to the lake *via* Vogelfontein in the six cars which at present provide the service, and at the latter place the Mayor held a reception.

The lake referred to is likely to play an important part in the annals of the system, for it is the most important boating station to be found for miles around, while the town itself is a leading pleasure and residential resort for the white workers in the mining districts. It is to the district mines that the cars will also run, and it says much for the enterprise of the Town Council when it is pointed out that the installation was undertaken at a cost of nearly £26,000, at a time when there was much unemployment, brought about by depression in the mining industry. On the Sunday after the inauguration of the system there was a religious service at the lake and a concert, when collections were made to relieve the distress. The depression was felt to such an extent that the Council had dispensed with the services of two of their leading officials. The duties of one of them was placed upon Mr. Guilford, the electrical engineer, who supervised the erection of four miles of the overhead double trolley wires supported by span construction. An additional single-wire installation has since been begun to the Vogelfontein power-station and the Palace Theatre. Current is obtained from the Victoria Falls Power Company, the Government having refused permission to the Council to raise money for the erection of a generating station. The charge made for power is 2·85d. delivered at a sub-station which the Council have had to erect for the housing of the converting equipment supplied by Bruce Peebles, Limited. Considerable criticism has been levelled at the charge, and it is hoped that the Provincial Council would find it within

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Opening of Railless Electric System at Boksburg, South Africa.

Railless Electric Cars in Union Street, Boksburg.

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their power to grant what the Government have refused.

Milnes, Voss, and Company supplied the car bodies, and the motors were from Siemens Brothers Dynamo Works, Limited. The cars were put together under the direction of Mr. Jeffs, who was sent out by the R.E.T. Company. The entrance to the car is by the side of the driver, who takes the fares of the passengers on entry. The cars have a maximum speed of 20 miles an hour, but they are operated at 12 miles an hour. On the inaugural day the flexibility of this system of traction resulted in a boy escaping being run over. His bicycle slipped and he was thrown immediately in front of the car, but by a turn of the driving wheel the motorman was able to divert the car.

TRAIL CARS FOR THE THAMES VALLEY.

The members of the Select Committee of the House of Commons who considered the London United Tramways Company's Bill were Mr. W. Guinness (chairman), Sir W. R. Essex, Mr. J. C. Lyttelton, and Mr. T. Richardson. In support of clause 6, which applied for powers to run trail cars, Mr. A. L. C. Fell, chief officer of London County Council Tramways, stated that the intention was not to cut down the service, but to provide for the better handling of rush traffic. Separate cars would occupy more space than would be the case with trail cars. The length of a car and trailer was about 61 ft., while the length of two separate cars was 70 ft. At the Tooting terminus of the County Council's system in the busy hours of the day they were turning 72 cars an hour, and eight of them were fitted with trail cars. There were enormous rushes at Hampton Court on the company's tramways at Bank Holiday periods and on Sundays, and he had seen great crowds waiting to get away. The County Council had authority to make an arrangement with the London United for mutual running powers, and such an arrangement at Tooting would greatly simplify the use of trail cars on both systems.

Chief Constable Craik, of the public carriage department, Scotland Yard, said that almost all the routes upon which trail cars could be run on the London United had dead ends, and at Kingston Hill it was on a slope. In reply to the chairman he admitted that it would abolish the inconvenience of dead ends if running powers were arranged between the County Council and the London United. In the opinion of the police, two cars coupled would increase obstruction more than two separate cars. The police were not objecting to the placing of 150 more trail cars on the London County Council lines.

Mr. Stephen Sellon, consulting engineer, and Mr. A. H. Pott, general manager of the London United and Metropolitan Electric Tramways, gave evidence that in their experience trail cars were the best means of dealing with the rush traffic. Mr. Sellon added that the difficulty in shunting could be easily met by apparatus which enabled the driver to drive from the end of the trail car.

Mr. J. Devonshire, managing director of the company, submitted diagrams showing the car loading on both ordinary and exceptional occasions. The latter embraced in one case over 80 cars to the hour, which was quite equal to anything in London traffic. The use of trail cars would be of advantage both to London and local traffic. In reply to the chairman, witness said he would give an undertaking that the intervals between the cars should not be prolonged. Last year, in spite of the extra services of omnibuses, the company had every available car out sometimes, and were unable to cope with the traffic.

Replying to the company's counsel, witness said he would pledge himself not to reduce the ordinary service. It would not be possible for the company to increase the provision of ordinary cars, seeing that they now had 250 per cent. in excess of their normal requirements. But the economy of the trail cars would be such that it would be possible to provide them. Tooting was one of the principal routes upon which trail cars were run by the London County Council, and he had been approached by the London authority with a proposal for through running which was recognised as very desirable.

After hearing opposition from Surbiton and Teddington the Committee granted the clause, subject to the conditions that the frequency of the present service of cars was not to be decreased; that the right to run trail cars should not affect any existing agreement on the matter between the company and a local authority save with the consent of such authority; and that the Surbiton spur should be excluded from the use of trail cars. Under clause 8 the company were given authority to carry additional passengers inside the cars during inclement weather, such extra passengers not to exceed one-third of the number of passengers the car is licensed to carry. Clause 7, which was also passed, gives power to reserve carriages for special purposes, to charge special fares, and to exclude the public from the right to use such cars.

LONDON COUNTY COUNCIL TRAMWAYS.

Second Year's Call on the Reserve Fund Due to Omnibus Competition.

It may be recalled that in the year ended March 31, 1913, the receipts of the London County Council Tramways showed a falling off of £111,843, due to motor omnibus competition. The result was that there was no sum of £138,151 to add to the renewals fund, as was the case in the previous year, the renewals fund then standing at £654,844. The allocation had to be made from the general reserve fund, which, with the addition of £84,551 made to it in 1911-12, totalled £205,558.

As the result of the continuance of the competition during the year ended March 31, 1914, Mr. R. C. Norman, chairman of the Finance Committee, in submitting the annual estimates to the Council on April 7, announced that for the first time the undertaking had failed to provide out of the revenue of the year the full amount required for the redemption of debt. The reserve fund would be drawn upon to the extent of £91,705 to make good the deficiency. The reserve fund had been built up out of surplus revenue of previous years, and after meeting the deficiency would amount to £181,851. It would not be possible to carry anything at all to the renewals fund, which after meeting the renewals expenditure for the past year would amount to £548,713. The current estimates could only be regarded as a rough guide. The traffic receipts were estimated at 9d. a car-mile, slightly more than the figure earned last year, and on this basis the estimates showed there would be a deficiency of £46,682 and no provision for renewals; this deficiency would again be met out of the general reserve fund. The unsatisfactory results of the past year and the uncertainty as to the future were due in the main to the competition of the motor omnibuses. The Highways Committee thought that the linking-up of dead-ends and minor extensions might lead to a more efficient and more remunerative service. The committee's difficulties were only part of a wider question; the competition was also severely felt by other tramway undertakings and by the railways which served the area of Greater London. This had led to a general demand that the motor omnibuses should be required to pay such a contribution to local funds as would lessen the handicap of taxes, rates on track, and road maintenance, and would also go some way towards meeting the heavy additional cost for roads thrown on local authorities by the new form of traffic. There was the further question as to whether it was desirable on financial grounds to allow the existing unlimited competition between omnibuses and rival forms of traffic to continue. A Select Committee of the House of Commons and the Council itself were in favour of some authority being set up which would have jurisdiction over all competing forms of locomotion with a view to regulation in the public interest, and the Council had decided to press for legislation in this respect. Parliament was fully alive to the urgency of the problem. It was proposed that the number of omnibuses should be limited, and the licence materially changed. At present, the licence was little more than a certificate of structural suitability.

Sir John Benn, as one who had had a large share in the creation of the tramway service, was gratified to think that the undertaking had weathered the gale. The tramways would survive until under sympathetic management and municipal policy they would not only be of greater service, but resume their previous financial position.

The estimates are to be further discussed on June 30.

City of London Corporation's Veto.

Report was made at the last meeting of the London County Council before the Easter recess that in connection with the proposal to extend the tramways from Farringdon Road to near Ludgate Circus, the City Corporation had desired the carrying out of a widening of the road near the markets, and that the cost would be prohibitive. Subsequently the Corporation refused their consent to this extension, and to extensions from Aldgate to near Mark Lane Station and to Aldgate Station. The schemes will, therefore, be deleted from this year's Parliamentary bill, with the exception of the Aldgate to Mark Lane extension. More than two-thirds of the route was in Stepney, and the Council of that borough had consented to the proposal. (This extension was sanctioned by a Committee of the House of Commons on April 28.)

Thermit Welds for Rail Joints.

It was estimated, the Highways Committee stated, that 1,500 rail joints would require to be welded on the tracks to be renewed during the year 1914-1915. Thermit, Limited, were prepared to supply the welding portions of the joints at 19s. 6d. each, and would in addition supply 7½ additional welding portions free of cost for every 100 ordered. In other respects the company were willing to renew their existing contract with the Council of May 1, 1913. The committee had arranged for an agreement embodying the terms to be entered into.

Appointment of a Consulting Engineer.

The chief officer of the tramways department having pointed out that it would be of great assistance to him to obtain at the present time the services of some well-known expert to advise on certain aspects of the work connected with the extension of Greenwich generating station, particularly from the point of view of steam consumption,

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which, having regard to the limited space available at the power-station and other considerations, was a matter of very great importance, the Highways Committee after having been in communication with Sir Alexander Kennedy reported that he had offered through Messrs. Kennedy and Donkin to advise generally on any question connected with engineering at the generating station for the tramway undertaking as to which the Council might desire to consult him. Messrs. Kennedy and Donkin were also prepared to act as engineers for the specifying and superintending of such new plant or work as the Council might place in their hands. The terms would be: (1) A retaining fee of £500 a year to cover all references, reports, and consultations: (2) as regards new work Messrs. Kennedy and Donkin to be paid a commission of 5 per cent. on all certificates for plant, etc., up to £50,000 a year and 4 per cent. on expenditure over this amount. As regarded new constructive work connected with the second stage of the extension at Greenwich power-station which was carried out substantially to specification already prepared by the chief officer of tramways, the commission to be 3 per cent. The recommendation was agreed to.

PARCEL DELIVERY COSTS.

It has been claimed that the least efficient service of electric vehicles is obtained on hilly routes. The contention is not supported by the experience gained with a 60-cell Edison battery operating a Detroit 1,000 lb. delivery van, which has been in continuous service since October 1, 1913, in a district with gradients up to 1 in 7. According to the *Electrical World*, four trips are made each day over a route on which horses could only make three trips. During January, 5,375 parcels were delivered and a total distance of 1,058 miles covered for an expenditure of 550 units. The detailed costs are as follow:

550 kw.-hour at 3·25d. per kilowatt-hour	£7·15
Garaging	4·00
Battery maintenance...	1·70
Tires (estimated life 12 months)	2·00
Miscellaneous repairs and upkeep	1·65
Painting and varnishing	0·85
Interest and depreciation	3·75
Total	£21·10
Driver and boy	18·00
Cost of delivery 5,375 packages	£39·10
Delivery cost per package	1·82d.

CORRESPONDENCE.

TO THE EDITOR OF THE TRAMWAY AND RAILWAY WORLD.

SIR,—In your issue of the 9th instant a slight error of substitution of a comma for a decimal point in my article on Metropolitan Traffic gives the L.G.O. Company the marvellous carrying power of 5,647 passengers per 'bus-mile instead of 5·647. To traffic experts the mistake is obvious, but not to all readers.

In the last paragraph on page 280, however, the transposition of a word in the eighth line, first sentence, has so completely altered the sense that I shall be glad if you will kindly point out the mistake. I wrote, and your printer at first set up the words as they were written "had the 'Bus Company to pay," etc., but I am made to say "the 'Bus Company had to pay," etc., which of course, is not the case.

Yours faithfully, A. J. LAWSON.

April 12th, 1914.

Goods Traffic on Tramways.—Bury and District Chamber of Commerce have appointed a deputation to urge upon the Tramways Committee the advisability of convening a conference of local authorities around Manchester for consideration of the possibility of using the tramways for goods traffic at night.

Suggested Tariff for Charging.—The Electric Vehicle Committee have forwarded a circular letter to municipal and company-owned electricity undertakings, embodying the committee's recommendations as to tariffs. These suggest that for "off peak" charging the maximum price should not exceed 1d. per unit at the supply authority's declared system and pressure. As to the price to be charged during peak load hours, the committee feels that very little charging should be necessary at such times, especially for commercial vehicles. Consequently, it does not consider it desirable to make any recommendations as to a tariff, leaving each supply authority or company to fix its own rate for such hours. The committee suggest that special encouragement should be given for charging during the hours between 11 p.m. and 6 a.m., and considers that during this period a supply might be given remuneratively at ¾d. per unit. The committee recommends that a scale of discounts be arranged to meet the case of large consumers, and it recommends a discount of 20 per cent. off the above rates for all energy purchased by a consumer for re-sale and metered on the latter's own premises. A minimum charge should be made for current supplied for any one charging operation, and the committee suggests that it ought not to exceed 2s.

TRACK MAINTENANCE AND MOTOR TRAFFIC.

ADDITIONAL ANNUAL COST OF £41,700 TO LONDON COUNTY COUNCIL.

At a meeting of the London County Council on February 10, long reports were submitted by the Highways Committee, the Improvements Committee, and the General Purposes Committee, on the subject of road maintenance, and of grants from the Road Board. The Highways Committee in their report stated that motor traffic (particularly rubber-tired vehicles) had injuriously affected the cement grouting in connection with repairs of the paving in the tramway tracks, and heavy motor tractors caused undue abrasion and crushing to the granite setts. The use of the more expensive bitumen grouting had recently been adopted in order that the sucking action of the rubber-tired vehicles would be counteracted. It was estimated that the extra cost entailed by the use of bituminous grouting amounted to about £20,000 a year, and this would increase. It was also estimated that the extra cost of paving works due to setts being crushed by heavy motor lorries would be about £5,200 during the current financial year. About 17 miles of single track were at present affected in this way, and any expansion of heavy motor traffic would increase this figure in the future. The cost of paving works affecting the tramway area showed an increase of about £16,500 a year compared with the cost under conditions existing before motor traffic reached its present dimensions. The total additional annual expenditure, therefore, is £41,700.

FINANCIAL REPORTS AND MEETINGS.

British Columbia Electric Railway.—An interim dividend at the rate of 8 per cent. per annum on deferred ordinary stock has been declared for the half-year ended December 31.

Melbourne Tramway and Omnibus Company.—The board have declared a dividend of 6d. per share for the quarter ended March 31, and also a bonus of like amount, making together 1s. per share.

Middleton Electric Traction Company. Lord Vaux of Harrowden presided at the annual meeting of the Middleton Electric Traction Company, on April 1, and stated that there was an increase of £1,211 in the traffic receipts, which constituted a record. He could see no reason why the improvement should not be maintained.

Dublin and Lucan Electric Railway.—As the result of the labour troubles in Dublin considerable losses were suffered by this company during the year ended December 31 last, and at the annual meeting on March 26 it was decided to carry the available balance of £109 to the next account, postponing for the present the payment of the cumulative preference dividend.

Oldham, Ashton, and Hyde Tramways.—The report for 1913 shows a revenue amounting to £35,495, and expenditure (including £1,000 for debenture interest and £4,500 placed to provision for renewals account) to £28,816, leaving a net profit of £6,679, while £218 was brought forward. A final dividend at the rate of 7 per cent. per annum is proposed on the ordinary shares, making 6 per cent. for the year, and carrying forward £147.

Tynemouth and District Electric Traction Company.—Out of a surplus of £5,500 on a total revenue of £15,028, the directors propose placing to reserve £1,250, paying dividend on cumulative preference shares at rate of 5 per cent. for the year, dividend on ordinary shares at rate of 5 per cent. for the year, carrying forward £417. Holders of 71 per cent. of the total issued share capital of the company have accepted the Northern Transport Company's offer to exchange the holdings for fully-paid shares in the new company, which intends to develop motor transport.

Brisbane Electric Tramways Investment Company.—A divisible balance of £115,848 is shown in the report for 1913. The directors place £40,000 to reserve fund (bringing it up to £50,000), and recommend a final dividend of 4s. per share, free of income tax on the ordinary shares, making 8 per cent. for the year, carrying forward £3,123. The renewal and other reserve funds now amount to £163,000. There is also an aggregate of balances carried forward of £6,559. Allotment letters for 30,000 new ordinary shares of £5 each will be posted to the shareholders with the dividend warrants.

Cork Electric Tramways.—The report for the year 1913 shows that the receipts amounted to £60,135, and the expenses to £37,523. Including the balance from 1912, and deducting interest on debentures there is a balance of £19,272. Half-yearly dividends at 5 per cent. were paid on the preference shares, £6,500 added to reserve, and £1,807 written off. The directors recommend payment of a dividend at the

(Continued on page 377.)

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Year Ended.	Electric Traction Inaugurated.	System.	Line open (single track). Mls. Chs.	Borrowing Powers.	Borrowing Powers Exercised.	Unexhausted Borrowing Powers.	Total Capital Expenditure.	Capital Expenditure per Mile of Single Track.	Loans Outstanding.	Loans Repaid and Sinking Fund.	Depreciation, Renewal and Reserve Funds.	Gross Receipts. Traffic.	Other.	Total.
Aberdeen	†May 31, 1913	Dec., 1899	E.	27 66	350,000	...	...	350,590	12,599	192,660	157,929	143,468	79,125	1,041	80,166
Accrington	†Mar. 31, 1913	Aug., 1907	,,	10 53	169,675	134,670	35,800	134,525	12,619	116,976	17,694	13,200	27,419	403	27,822
Ashton-u-Lyne	†Mar. 25, 1913	Aug., 1902	,,	8 15	130,070	108,099	21,971	108,093	13,203	79,589	28,510	2,150	22,206	285	22,491
Ayr	†May 15, 1913	Sept., 1901	,,	7 49	...	...	...	85,445	11,224	78,933	18,044	14,918	15,626	670	16,296
Birmingham	†Mar. 31, 1913	Jan., 1904	,,	108 32	2,302,001	2,089,194	212,807	1,981,588	18,280	1,874,109	215,084	220,369	574,248	7,318	581,566
Blackburn	†Mar. 25, 1913	Mar., 1899	,,	24 63	408,174	342,474	65,700	334,924	13,512	254,600	167,381	1,000	63,440	3,243	66,683
Blackpool	†Mar. 31, 1913	June, 1899	,,	21 31	453,798	301,796	152,002	301,796	14,115	301,796	114,086	15,126	73,155	1,011	74,166
Bolton	†Mar. 31, 1913	Dec., 1899	,,	47 17	552,208	551,019	1,189	559,107	11,842	338,439	162,580	55,901	135,149	1,313	136,462
Bradford	†Mar. 31, 1913	July, 1898	,,	(h)103 69	1,269,568	982,398	287,170	1,002,566	9,653	607,928	388,335	89,072	280,758	18,345	299,103
Brighton	†Mar. 31, 1913	Nov., 1901	,,	17 15	358,620	279,000	80,715	277,914	16,170	223,556	55,653	6,708	51,780	2,018	53,798
Burnley	†Mar. 31, 1913	Dec., 1901	,,	22 13	388,052	339,125	48,927	231,601	10,450	179,498	56,652	48,212	79,641	249	79,890
Burton-on-Trent	†Mar. 31, 1913	Aug., 1903	,,	9 60	108,632	104,562	4,070	106,225	10,895	50,583	53,979	8,966	14,383	1,304	15,687
Bury	†Mar. 31, 1913	June, 1903	,,	21 14 (b)13 21	407,800	280,775	127,025	283,005	13,365	262,135	42,877	(l)24,571	67,370	284	67,654
Chester	†Mar. 25, 1913	April, 1903	,,	6 35	92,991	82,380	10,611	82,934	12,883	69,727	12,785	2,968	12,272	458	12,730
Chesterfield	†Mar. 31, 1913	Dec., 1904	,,	5 8	95,000	70,500	24,500	69,575	13,642	58,510	11,990	5,031	12,220	474	12,694
Colchester	†Mar. 31, 1913	July, 1904	,,	7 75	70,748	69,555	1,193	69,401	8,743	53,425	17,049	Nil.	10,281	477	10,758
Croydon	†Mar. 31, 1913	June, 1906	,,	19 10	287,689	287,689	Nil	284,847	14,894	230,968	87,264	42,453	90,543	1,921	92,464
Darlington	†Mar. 31, 1913	June, 1904	,,	8 71	107,500	76,263	31,237	76,322	8,587	56,888	19,434	5,726	11,842	334	12,176
Darwen	†Mar. 31, 1913	Oct., 1900	,,	7 13	93,400	86,300	7,100	86,300	12,048	57,330	28,280	7,450	14,244	1,176	15,420
Derby	†Mar. 31, 1913	July, 1904	E. H.	22 5	... ...	... ...	... ...	242,785 ...	11,004 ...	157,213 ...	85,572 ...	(a)4,486 ...	E 46,820 H 394	1,030 22	47,850 416
Doncaster	†Mar. 31, 1913	June, 1902	E.	12 42	...	...	...	99,172	7,918	80,400	14,741	780	19,928	334	20,262
Dundee	†May 15, 1913	July, 1900	,,	27 38	(f)	345,450	...	352,663	12,835	262,038	83,411	71,823	63,395	1,650	65,045
East Ham	†Mar. 31, 1913	June, 1901	,,	14 32	190,643	190,242	401	191,583	13,307	148,515	58,075	5,097	57,050	610	57,660
Exeter	†Mar. 31, 1913	April, 1905	,,	7 0	106,000	86,111	19,889	86,111	12,301	69,376	17,209	5,915	16,748	Nil	16,748
Gloucester	†Mar 31, 1913	April, 1904	,,	15 0	191,000	144,243	46,757	147,692	9,846	111,051	16,816	750	16,177	1,168	17,345
Halifax	†Mar. 31, 1913	June, 1898	,,	54 70	449,263	412,876	36,387	414,246	7,549	299,480	105,948	27,379	104,947	1,026	105,973
Ilford	†Mar. 31, 1913	Mar., 1903	,,	11 28	149,633	149,633	Nil	149,500	13,171	109,912	39,721	5,611	24,361	2,407	26,768
Ilkeston	†Mar. 31, 1913	May, 1903	,,	3 60	64,214	47,000	17,214	47,883	12,769	42,500	13,660	Nil	6,006	58	6,064
Ipswich	†Mar. 31, 1913	Nov., 1903	,,	14 70	116,471	114,300	2,171	114,838	7,720	98,858	16,305	8,180	22,575	829	23,404
Keighley	†Mar. 31, 1913	Oct., 1904	,,	6 9	50,934	47,328	3,606	47,328	7,743	32,468	16,961	942	8,845	313	9,158
Kilmarnock	†May 15, 1913	Dec., 1904	,,	5 47	65,000	52,625	12,375	53,191	9,519	44,766	7,379	4,017	8,543	248	8,791
Kirkcaldy	†May 15, 1913	Feb., 1903	,,	8 45	213,000	96,748	116,252	96,749	11,025	80,333	16,415	4,161	15,712	494	16,206
Lancaster	†Mar. 31, 1913	Jan., 1903	,,	4 65	60,000	51,550	8,450	43,432	9,022	36,200	13,838	3,000	5,437	143	5,580
Leith	†May 15, 1913	Aug., 1905	,,	17 73	275,000	237,300	37,700	236,155	14,572	186,500	50,800	514	34,664	1,030	35,694
Leyton	†Mar. 31, 1913	Dec., 1906	,,	18 40	306,427	306,371	56	295,376	15,966	249,165	48,876	3,445	68,809	1,558	70,367
Lincoln	†Mar. 31, 1913	Nov., 1905	S.	2 77	98,519	44,947	53,572	44,992	15,187	42,893	9,862	(a) 1,600	6,717	128	6,845
Liverpool	Dec. 31, 1913	Nov., 1898	E.	119 0	...	...	...	2,024,706	17,014	1,177,384	1,091,771	428,318	677,881	13,018	690,899
Lowestoft	†Sep. 30, 1913	July, 1903	,,	4 6	96,230	89,912	6,318	89,912	22,064	76,283	15,251	...	11,365	296	11,661
Maidstone	†Mar. 31, 1913	July, 1904	,,	7 3	82,932	82,582	350	79,098	11,239	67,191	15,391	Nil.	9,761	535	10,296
Manchester	†Mar. 31, 1913	June, 1901	,,	188 30	2,355,689	2,034,371	321,318	2,061,791	10,945	1,543,504	437,305	479,683	876,023	11,624	887,647
Nelson	†Mar. 31, 1913	Feb., 1903	,,	3 69	38,000	37,832	168	37,832	9,795	30,118	7,714	...	10,240	51	10,291
Newport (Mon.)	†Mar. 31, 1913	April, 1903	,,	14 28	219,250	196,250	23,000	193,191	13,463	164,763	31,487	9,095	37,555	995	38,550
Nottingham	†Mar. 31, 1913	Jan., 1901	,,	37 40	730,300	725,945	4,355	638,005	17,479	426,818	217,041	64,242	164,746	2,404	167,150
Oldham	†Mar. 25, 1913	May, 1902	,,	28 6 (b) 8 31	516,923	440,204	76,719	442,174	15,750	320,725	118,217	2,135	108,003	2,574	110,577
Perth	†May 15, 1913	Nov., 1905	,,	6 60	90,000	78,350	11,650	78,629	11,649	63,340	15,489	1,673	8,761	509	9,270
Plymouth	†Mar. 31, 1913	Sept., 1899	,,	15 0	...	189,512	...	219,417	14,628	90,925	37,826	17,550	37,925	1,123	39,048
Pontypridd	†Mar. 31, 1913	Mar., 1905	,,	8 48	136,019	135,919	100	137,148	15,946	109,757	26,052	Nil	21,580	313	21,893
Rawtenstall	†Mar. 31, 1913	May, 1909	,,	15 71	193,290	181,526	11,764	181,776	14,442	162,451	19,075	3,177	25,410	1,126	26,536
Rochdale	†Mar. 31, 1913	May, 1902	,,	(i) 40 2	356,991	347,782	9,209	353,066	15,401	347,782	83,475	5,904	80,058	287	80,345
Rotherham	†Mar. 31, 1913	Jan., 1903	,, R.T	12 2 ...	... ...	... ...	... ...	162,504 ...	13,542 ...	144,850 ...	27,250 ...	21,203 ...	40,232 2,457	26 Nil	40,258 2,457
Salford	†Mar. 31, 1913	Oct., 1901	E.	75 64	1,050,666	723,669	326,997	723,672	9,547	536,791	258,977	45,699	260,365	486	260,851
Southampton	†Mar. 31, 1913	Jan., 1900	,,	18 35	276,755	252,164	24,591	255,154	13,974	170,637	79,732	12,595	64,186	2,348	66,534
Southend-on-Sea	†Mar. 31, 1913	July, 1901	,,	11 49	130,000	129,961	39	143,808	12,384	116,940	12,784	3,045	34,453	465	34,918
Southport	†Mar. 31 1913	July, 1900	,,	(d) 10 63	292,000	196,500	95,500	118,708	11,004	153,530	42,970	442	16,928	386	17,314
South Shields	†Mar. 31, 1913	Mar., 1906	,,	10 21	251,883	174,936	76,947	172,476	16,806	150,228	30,818	20,838	33,654	498	34,152
Staly'ge, H., M., D.	†Mar 31, 1913	May, 1904	,,	27 57	325,270	274,990	44,280	279,778	10,096	224,700	56,290	500	34,961	677	35,638
Stockport	†Mar. 31, 1913	Aug., 1901	,,	27 5	305,028	217,804	87,224	251,508	9,145	167,300	67,199	33,552	(n)62,979	1,198	64,178
Sunderland	†Mar. 31, 1913	Aug., 1900	,,	20 28	308,699	303,211	5,488	305,234	14,999	182,318	111,943	31,883	68,507	364	68,871
Wallasey	†Mar. 31, 1913	Mar., 1902	,,	19 69	198,167	195,290	2,877	215,424	10,846	167,924	58,733	11,927	57,458	564	58,022
Walsall	†Dec. 31. 1913	Dec., 1902	,,	19 44	188,145	188,100	45	183,351	9,378	159,561	58,366	33,873	32,991	682	33,673
Walthamstow	†Mar 31, 1913	June, 1905	,,	12 42	198,000	180,000	18,000	173,241	13,851	160,982	19,018	4,687	37,191	785	37,976
Warrington	†Mar. 31, 1913	April, 1902	,,	9 52	103,674	102,896	778	102,128	10,583	73,830	29,068	10,000	22,903	302	23,205
West Ham	†Mar. 31, 1913	Feb., 1904	,,	30 4	563,478	551,463	12,015	556,878	18,532	539,650	90,402	40,352	137,766	676	138,442
Wigan	†Mar. 31, 1913	April, 1901	,,	(k) 34 42	...	...	...	...	...	...	...	...	71,268	1,515	72,783
Wolverhampton	†Mar. 31, 1913	April, 1902	S.	21 40	279,733	265,616	14,117	278,615	12,959	217,882	47,734	50,220	53,963	797	54,760
Yarmouth (Gt.)	†Mar. 31, 1913	June, 1902	E.	14 32	144,500	119,750	24,750	121,899	8,465	111,450	22,737	6,070	23,625	508	24,133

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast	†Mar. 31, 1913	Nov., 1905	E.	98 54	1,567,674	1,386,232	181,442	1,389,713	14,037	1,381,200	144,342	117,769	250,589	3,788	254,377
Bexley	†Mar. 31, 1913	Oct., 1903	,,	6 42	99,942	97,387	2,555	96,927	14,912	76,492	20,895	959	13,654	(a)1,542	15,196
Birkenhead	†Mar. 31, 1913	Feb., 1901	,,	24 7	375,848	364,854	10,994	366,610	15,220	247,012	117,863	18,070	61,202	4,365	65,567
Bournemouth	†Mar. 31, 1913	July, 1902	,,	(e) 29 62	449,027	...	...	435,788	19,500	221,797	134,815	13,733	95,695	317	96,012
Cardiff	†Mar. 31, 1913	May, 1902	,,	31 66	818,573	787,292	19,564	783,270	24,612	542,488	244,803	92,968	129,265	21,361	150,626
Coventry	†Mar. 31 1913	Jan., 1912	,,	15 40	220,538	216,436	4,102	211,298	13,632	216,436	3,287	2,876	38,996	157	39,153
Glasgow	†May 31, 1913	Oct., 1898	,,	193 47 (b) 2 52	3,714,266	3,553,584	160,682	3,694,143	18,595	2,479,408	1,074,177	2,079,645	1,007,653	3,891	1,011,544
Huddersfield	†Mar. 31, 1913	Feb., 1901	,,	46 0	646.284	407,142	239,142	417,408	9,074	255,177	161,349	19,132	106,586	3,123	109,709
Hull	†Mar. 31, 1913	July, 1899	,,	30 44	677,673	541,871	135,802	542,371	17,753	527,641	147,925	125,407	157,048	1,393	158,441
Leeds	† Mar. 31, 1913	Aug., 1897	,,	112 62	1,603,455	1,546,422	57,033	1,511,588	13,406	1,220,041	482,698	4,637	407,552	3,979	411,531
Leicester	†Dec. 31, 1913	May, 1904	,,	37 0	929,120	727,405	201,715	739,982	19,999	602,478	129,807	100,000	147,458	17,059	164,517
London	†Mar. 31, 1913	...	H.	15 70									37,544	879	38,423
		May, 1903	C.E	272 40	(c)	(c)	(c)	12,268,095	...	11,734,060	2,515,747	906,796	2,143,559	69,748	2,213,307
N'castle-on-Tyne	†Mar. 31, 1913	Dec., 1901	E.	61 0	1,522,010	1,251,047	270,963	1,234,080	20,230	939,120	383,921	119,407	228,091	10,114	238,205
Northampton	†Mar. 31, 1913	July, 1904	,,	9 13	239,800	127,255	112,545	135,481	14,786	91,176	36,078	10,499	27,250	899	28,149
Portsmouth	†Mar. 31, 1913	Sep., 1901	,,	30 66	662,280	698,319	...	712,792	23,118	647,489	234,258	94,934	108,087	1,745	109,832
Preston	†Mar. 31, 1913	June, 1904	,,	17 16	224,102	187,270	36,832	187,269	10,888	119,790	42,091	36,841	42,964	306	43,270
Reading	†Mar. 31, 1913	July, 1903	,,	13 14	235,000	234,000	1,000	229,372	17,409	169,642	59,896	17,831	32,984	1,030	34,014
Sheffield	†Mar 25, 1913	Sep., 1899	,,	77 67	1,727,596	1,413,980	313,616	1,411,959	18,140	1,067,897	418,292	27,521	358,656	3,189	361,845
Wellington, N.Z.	†Mar. 31, 1913	...	,,	30 7	496,423	496,423	Nil	606,771	20,165	496,423	39,486	109,066	149,446	826	150,272

C—Electric conduit system. E—Electric trolley system. H—Horse lines RT—Railless trolley system. S—Surface contact system.
(a) Accident insurance fund. (b) Additional lines leased and worked. (c) Conferred by Annual Money Act, which limits amount for each financial year. Powers not exercised are lapsed. (d) Not including 8 m. 78 ch. leased lines. (f) Unlimited. (h) Includes 1¼ miles railless trolley route. (i) 17 mi. 8 chn. single track leased. (k) Not including 10 miles 3 chains single track lines leased. (l) Including Insurance. (n) Includes £114 trackless cars. (o) Includes £1,310 through-running contributions.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Working Expenses.					Gross Profit on Working.	Additions to Gross Profit	Deductions from Gross Profit.					Net Surplus + or Deficit −
	Traffic.	General.	Repairs & Maintenance.	Power.	Total.			Interest.	Sinking Fund.	Income Tax.	Depreciation & Renewal.	Sundries.	Total.	
Aberdeen	20,710	9,404	5,954	7,138	43,206	36,960	472	6,839	4,661	...	13,407	...	24,907	+ 12,525
Accrington	6,839	1,870	2,102	4,644	15,455	12,367	...	4,000	3,693	127	...	...	7,820	+ 4,553
Ashton-under-Lyne	4,840	1,754	2,118	3,278	11,990	10,501	...	2,727	3,651	485	500	371	7,734	+ 2,767
Ayr	3,486	1,964	1,604	1,989	9,043	7,253	...	1,972	1,943	122	2,041	...	6,078	+ 1,175
Birmingham	160,277	40,898	68,278	100,726	370,179	211,387	11,479	65,672	49,946	...	...	5,896	121,514	+101,352
Blackburn	14,863	4,262	12,392	10,999	42,516	24,167	110	5,292	14,909	206	...	...	20,407	+ 3,870
Blackpool	15,992	5,132	9,286	9,272	39,682	34,484	...	(h) 9,184	6,969	...	8,000	...	24,153	+ 10,331
Bolton	29,821	8,646	15,984	19,767	74,213	62,244	1,114	(h) 11,189	17,197	1,095	18,715	219	48,415	+ 14,943
Bradford	83,763	24,458	46,061	46,271	200,553	98,550	4,045	20,735	31,926	3,653	32,921	4,360	93,595	+ 9,000
Brighton	14,309	4,028	12,853	8,316	39,506	14,292	27	7,800	5,560	...	27	...	13,360	+ 932
Burnley	18,718	5,306	9,525	15,881	49,430	30,460	...	5,662	6,491	893	...	(f) 2,873	15,919	+ 14,541
Burton-on-Trent	5,111	1,322	2,903	2,998	12,334	3,353	...	1,406	1,418	...	1,500	...	4,324	− 971
Bury	14,761	4,349	6,633	8,026	33,769	33,885	337	(h) 7,974	4,824	244	...	(w) 11,608	24,650	+ 9,572
Chester	3,349	1,574	878	2,203	8,004	4,726	93	(h) 2,761	1,018	..	1,040	...	4,819	...
Chesterfield	2,739	1,230	1,912	2,110	7,991	4,703	253	2,287	1,849	...	...	...	4,136	+ 820
Colchester	2,825	1,189	1,771	2,508	8,293	2,465	48	(h) 2,159	2,319	...	...	...	4,478	− 1,965
Croydon	29,571	6,806	13,300	16,541	66,218	26,246	907	7,994	7,428	1,145	...	...	16,567	+ 10,586
Darlington	4,192	754	1,912	1,945	8,811	3,365	102	2,010	1,966	105	404	59	4,544	− 1,077
Darwen	3,594	831	3,096	2,395	9,916	5,504	141	2,298	2,191	...	1,050	...	5,539	+ 106
Derby	E 16,388 H 631	2,621 ...	4,768 73	8,200 ...	31,977 704	15,873 def. 288	547	6,388	3,363	...	310	(l) 300	10,361	+ 6,059
Doncaster	4,364	1,156	4,648	3,561	13,779	6,483	84	2,876	1,757	...	664	...	5,277	+ 1,290
Dundee	16,477	5,607	7,122	10,216	39,422	25,623	...	8,606	6,020	233	9,254	...	24,113	+ 1,510
East Ham	17,280	6,330	11,722	10,072	45,404	12,256	...	(h) 5,806	6,725	...	...	454	12,985	− 729
Exeter	4,511	1,175	1,311	3,499	10,496	6,252	...	(h) 2,347	1,814	48	...	...	4,209	+ 2,043
Gloucester	6,891	1,687	3,200	1,914	13,782	3,563	...	(h) 4,502	2,772	...	750	...	8,024	− 4,461
Halifax	27,116	8,306	15,263	18,976	69,661	36,312	51	10,159	10,562	...	6,701	1,760	29,182	+ 7,181
Ilford	9,482	2,424	4,116	4,279	20,301	6,467	557	4,894	4,146	...	...	...	9,040	− 2,016
Ilkeston	2,057	614	2,497	1,308	6,476	def. 412	524	1,748	1,694	...	...	(i) 412	3,854	− 3,330
Ipswich	8,072	1,827	4,015	3,502	17,416	5,988	...	(h) 3,642	2,078	...	...	...	5,720	+ 268
Keighley	2,692	768	893	1,612	5,971	3,187	179	1,116	1,881	...	...	(m) 369	3,366	...
Kilmarnock	2,921	5 9	800	1,633	5,953	2,838	...	(h) 1,623	1,233	3	1,160	28	4,047	− 1,209
Kirkcaldy	4,728	1,158	1,525	2,636	10,047	6,159	...	2,660	1,608	...	410	110	4,788	+ 1,370
Lancaster	2,237	474	872	1,621	5,204	376	80	1,243	1,467	...	...	...	2,710	− 2,254
Leith	9,204	2,631	4,213	3,468	19,516	16,178	272	(h) 6,343	7,750	15	...	70	14,176	+ 2,274
Leyton	(p) 21,929	6,544	11,592	12,875	52,940	17,427	133	10,048	8,064	...	...	228	18,340	− 780
Lincoln	1,478	625	989	925	4,017	2,828	153	1,529	1,071	...	...	...	2,600	+ 381
Liverpool	180,226	61,361	84,026	121,185	446,798	244,101	24,220	48,971	60,318	...	(d) 54,163	(e) 4,869	168,321	+100,000
Lowestoft	3,320	743	1,579	2,685	8,327	3,334	..	(h) 2,439	2,031	...	...	...	4,530	− 1,196
Maidstone	2,405	1,018	1,469	1,903	6,795	3,501	58	2,687	2,243	...	...	32	4,962	− 1,403
Manchester	255,604	83,574	81,879	133,681	557,738	329,909	14,282	55,771	52,394	8,613	96,351	(e) 31,062	244,191	+100,000
Nelson	2,425	677	1,320	2,006	6,428	3,863	...	1,008	966	...	...	...	1,974	+ 1,899
Newport (Mon.)	10,254	4,009	10,364	7,014	31,671	6,879	808	5,817	4,197	...	...	...	10,014	− 2,327
Nottingham	43,601	15,142	18,684	30,847	103,274	58,886	...	14,349	19,762	...	...	...	34,111	+ 24,775
Oldham	25,759	7,792	18,416	21,470	73,437	37,140	1,474	15,736	11,822	1,099	...	(g) 7,762	36,479	+ 2,135
Perth	3,182	698	418	1,252	5,550	3,720	50	1,523	1,632	3	612	...	3,770	...
Plymouth	8,031	4,161	4,322	7,905	24,419	14,629	1,257	4,793	3,932	...	4,465	...	13,190	+ 2,696
Pontypridd	5,017	1,395	5,476	3,196	15,084	6,809	1,754	(h) 4,009	4,160	...	...	39	8,208	+ 355
Rawtenstall	5,415	2,133	3,445	4,113	15,106	11,430	(q) 1,612	5,947	6,113	...	...	...	12,060	+ 982
Rochdale	18,354	4,363	8,535	10,746	41,998	38,347	7,594	11,454	9,594	700	1,382	(z) 9,483	32,613	+ 13,328
Rotherham	E 9,212 RT 557	2,778 273	5,711 633	8,591 369	26,292 1,832	13,966 625	...	4,918 73	3,261 ...	...	5,037 ...	...	13,216 73	+ 750 + 552
Salford	73,745	17,785	22,183	47,371	161,084	99,767	5,659	(h) 18,749	21,912	2,522	12,867	(k) 27,376	83,426	+ 22,000
Southampton	19,403	5,269	10,092	12,280	47,049	19,485	9,151	7,290	7,241	565	5,000	1,422	21,518	+ 7,118
Southend-on-Sea	8,046	2,260	3,534	6,187	20,027	14,891	4,228	(h) 3,834	1,753	...	4,017	...	9,605	+ 9,514
Southport	4,428	2,140	2,662	3,263	12,493	4,821	6,362	6,513	5,017	...	1,977	628	14,135	− 2,952
South Shields	7,929	3,263	2,659	5,370	19,221	14,931	313	(h) 5,488	3,438	...	...	...	8,926	+ 6,318
Staly'dge, H., M., D.	12,148	4,018	6,273	6,445	28,884	6,754	...	(h) 7,711	7,308	...	327	532	15,878	− 9,124
Stockport	13,876	3,520	6,852	5,929	30,179	33,998	1,197	5,639	8,701	1,053	2,698	5,602	23,696	+ 11,500
Sunderland	18,431	4,552	4,670	11,268	38,921	29,950	252	(h) 7,228	10,366	476	7,132	...	25,202	+ 5,000
Wallasey	17,249	4,326	5,695	10,660	37,930	20,092	316	5,522	4,559	...	634	...	10,715	+ 9,693
Walsall	8,019	3,201	4,678	5,710	21,608	12,065	1,371	5,191	3,439	458	1,868	...	10,956	+ 2,480
Walthamstow	14,731	2,646	6,717	8,175	32,269	5,707	210	(h) 6,085	2,698	...	...	...	8,783	− 2,866
Warrington	5,529	1,779	4,255	3,235	14,798	8,407	408	2,580	3,254	...	...	...	5,834	+ 2,981
West Ham	51,254	11,253	26,921	19,386	108,814	29,628	508	19,511	12,369	685	...	959	33,524	− 3,388
Wigan	...	...	...	...	41,318	31,465	...	13,859	12,391	...	...	3,781	...	...
Wolverhampton	12,259	4,157	7,334	6,778	30,528	24,232	(x) 1,131	7,788	5,146	100	4,915	(a) 3,637	21,586	+ 3,777
Yarmouth (Gt.)	7,443	1,867	2,634	4,388	16,332	7,801	95	(h) 4,094	2,740	...	...	...	6,834	+ 1,062

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast	73,836	13,642	32,519	23,887	143,884	110,492	1,363	45,900	24,541	2,023	13,000	1,628	87,092	+ 24,763
Bexley	3,455	1,011	2,332	1,167	(a) 10,118	5,078	40	2,850	2,410	...	242	..	5,502	− 384
Birkenhead	16,099	4,011	10,380	9,371	39,861	25,706	86	(h) 11,537	9,501	269	4,302	183	25,792	...
Bournemouth	22,307	6,912	9,107	13,967	52,293	43,719	723	10,733	15,371	...	...	(e) 8,017	34,121	+ 10,321
Cardiff	37,582	(c) 11,176	15,351	20,184	84,293	66,333	1,732	24,138	22,801	800	6,946	...	54,685	+ 13,380
Coventry	10,112	4,289	6,952	2,765	24,118	15,035	2,950	10,379	6,163	...	1,258	...	17,800	+ 185
Glasgow	305,400	122,812	142,988	48,147	619,347	392,197	58,631	81,774	97,077	13,388	215,757	9,829	417,825	+ 33,003
Huddersfield	26,842	6,064	22,638	9,933	65,527	44,182	61	(h) 11,749	10,904	1,630	..	...	24,283	+ 19,960
Hull	47,495	12,212	42,005	11,245	112,957	45,484	1,500	16,730	12,201	1,500	(u) 3,118	...	33,549	+ 13,435
Leeds	109,413	36,055	39,894	28,455	213,817	197,714	7,511	42,197	49,923	5,021	41,752	4,957	143,850	+ 61,375
Leicester	54,257	10,405	21,566	23,887	110,115	54,402	3,763	23,541	12,453	2,122	7,636	2,413	48,165	+ 10,000
London	H 19,064 E 742,157	4,670 (r) 185,634	6,592 312,395	(m) 22,122 220,042	52,448 1,460,228	def. 14,025 753,079	... 33,397	342,645	388,042	28,188	497	(t) 27,104	786,476	...
N'castle-on-Tyne	64,493	18,675	25,944	19,908	129,020	103,185	3,966	30,431	39,556	3,179	...	6,796	79,962	+ 33,189
Northampton	7,254	3,080	2,489	3,563	16,386	11,763	279	2,481	4,312	323	...	(b) 1,226	9,342	+ 2,700
Portsmouth	28,918	10,200	7,877	5,231	52,226	57,606	8,831	20,875	17,462	964	8,412	350	48,063	+ 18,374
Preston	10,781	4,592	6,263	2,429	24,065	19,205	...	3,933	4,891	...	3,649	1,358	13,831	+ 5,374
Reading	8,837	3,702	3,648	3,358	19,545	14,469	...	6,714	4,662	291	...	...	11,667	+ 2,802
Sheffield	113,235	22,312	43,656	28,487	207,690	154,155	3,057	35,616	40,663	3,786	30,187	213	110,465	+ 46,748
Wellington, N.Z.	56,296	7,242	21,330	16,260	101,128	49,144	2,664	19,961	4,778	...	14,068	4,702	43,509	+ 8,299

(a) Includes £4,393 loss on motor omnibuses. (b) Includes £560 loss on omnibus account. (c) Includes £1,611 insurance fund. (d) Includes reserve.
(e) Includes rents for leased lines. (f) £2,061 rent of leased lines. (g) Includes rents of lines and deficit 1912. (h) Including income tax. (i) Loss on working.
(k) Includes rents of lines. (l) Including loss on horse traction. (m) Horsing expenses. (n) Transferred to motor omnibus capital account.
(p) Includes £396 horse account. (q) Aid from rates £1,500. (r) Including special charges, £5,911. (s) Includes £2,158 through-running contributions to L.C.C.
(u) District fund widening streets. (w) Amount apportioned to leased lines. (x) Includes £6,469 rent of leased lines. (z) Includes £306 profit on motor char-a-banc.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Appropriation of Net Surplus.			Receipts per Car Mile.		Operating Expenses per Car Mile.					Percentage of Operating Expenses to Total Revenue.	Average Operating Expenses per Car Mile (excludi'g Power Cost).	Board of Trade Units.		
	Carried Forward.	Reserve.	Contribution to Rates or Municip'l Funds.	Average Total per Car Mile. d.	Average Traffic per Car Mile. d.	Traffic. d.	General. d.	Repairs and Maintenance. d.	Power. (Price paid) d.	Total. d.	%	d.	Units.	Cost per Unit. d.	Units used per car mile.
Aberdeen ...	...	12,525	...	11·06	10·92	2·859	1·298	·822	·985	5·964	53·89	4·979	2,110,964	·81	1·21
Accrington ...	460	3,359	724	12·57	12·38	3·03	·84	·95	2·10	6·98	55·55	4·88	907,721	1·24	1·70
Ashton-u-Lyne	...	...	1,000	11·682	11·534	2·514	·911	1·100	1·703	6·228	53·31	4·525	622,183	1·25	1·346
Ayr...	..	1,175	...	10·13	9·713	2·16	1·23	·99	1·24	5·62	55	4·35	378,570	1·26	·98
Birmingham ...	...	45,000	56,352	10·62	10·492	2·929	·747	1·248	1·840	6·764	63·6	4·924	21,594,889	1·119	1·64
Blackburn ...	3,870	...	...	14·02	13·34	3·12	·90	2·61	2·31	8·94	56·84	6·63	2,030,535	1·3	1·81
Blackpool ...	...	2,667	7,664	16·93	16·71	3·64	1·17	2·12	2·12	9·05	53·50	6·95	1,400,209	1·587	1·33
Bolton	443	...	14,500	11·558	11·447	2·525	·733	1·354	1·674	6·286	54·915	4·612	4,315,448	1·1	1·52
Bradford	...	...	9.000	12·021	11·314	3·366	·983	1·859	1·860	8·068	67·051	5·687	11,126,989	1	1·863
Brighton	932	...	...	11·545	11·112	3·071	·864	2·758	1·785	8·478	73·43	6·693	1,663,126	1·2	1·49
Burnley	...	5.791	8,750	13·226	13·185	3·098	·878	1·577	2·630	8·183	61·85	5·55	3,079,155	1·214	2·11
Burton-on-Trent	...	...	...	8·61	7·90	2·81	·73	1·45	1·42	6·41	78·7	4·99	515,622	1·39	1·01
Bury	...	(i) 4,572	5,000	10·22	10·04	2·214	·685	1·152	1·290	5·341	49·91	4·051	2,039,011	1·081	1·271
Chester	...	...	...	8·81	8·50	2·32	1·09	·61	1·52	5·54	63	4·02	385,132	1·33	1·11
Chesterfield ...	...	820	...	10·51	10·12	2·27	1·02	1·58	1·75	6·62	62·9	4·87	405,096	1·25	1·39
Colchester ...	...	...	...	7·98	7·627	2·096	·882	1·313	1·86	6·151	76·74	4·291	401,208	1·5	1·24
Croydon	...	7.586	3,000	8·381	8·207	2·763	·637	1·224	1·499	6·123	70·91	4·497	2,484,993	1·604	·938
Darlington ...	...	...	...	7·651	7·441	2·633	·480	1·202	1·222	5·537	72·36	4·315	466,784	1	1·222
Darwen	106	...	...	14·218	14·204	3·771	·783	2·833	2·396	9·783	64·30	7·387	...	...	...
Derby	6,059	...	...	E 9·884 H. 5·649	9·671 5·347	3·385 8·564	·541 ...	·985 ·994	1·694 ...	6·605 9·558	66·8 169·4	4·911 ...	1,357,232 ...	1·45 ...	1·168 ...
Doncaster ...	...	1,290	...	9·41	9·25	2·03	·54	2·18	1·65	6·40	69·1	4·75	683,651	1·25	1·32
Dundee	...	10	1.500	11·480	11·189	2·908	·989	1·257	1·803	6·957	60·6	5·154	2,451,897	1	1·803
East Ham ...	.	..	...	10·06	9·95	3·02	1·10	2·04	1·76	7·92	78·8	6·16	2,139,401	1·125	1·55
Exeter	...	2,043	...	9·272	9·272	2·498	·650	·726	1·937	5·811	62·67	3·874	516,793	1·625	1·192
Gloucester ...	...	...	...	6·618	6·173	2·630	·644	1·255	·730	5·259	79	4·529	480,442	1	·73
Halifax	...	...	7,181	11·816	11·702	3·023	·926	1·702	2·116	7·767	65	5·65	3,900,902	1·125	1·81
Ilford	...	...	...	7·616	7·464	2·698	·689	1·171	1·218	5·776	76·4	4·558	960,866	1·07	1·098
Ilkeston	...	...	...	6·727	6·661	2·281	·681	2·77	1·451	7·183	106·79	5·732	326,198	1	1·50
Ipswich	268	...	...	8·408	8·110	2·900	·657	1·442	1·258	6·257	74·41	4·999	672,411	1·25	1·007
Keighley	...	...	...	9·064	8·754	2·664	·761	·890	1·595	5·910	65	4·315	254,636	1·5	1·05
Kilmarnock ...	...	...	...	7·09	6·89	2·357	·482	·646	1·317	4·802	66·3	3·487	313,550	1·25	1·06
Kirkcaldy ...	1,370	...	...	8·22	7·97	2·398	·587	·774	1·337	5·096	63·95	3·75	632,581	1	1·337
Lancaster ...	...	...	...	7·92	7·61	3·130	·664	1·221	2·269	7·284	91	5·015	228,902	1·7	1·33
Leith	2,274	...	...	9·07	8·81	2·34	·67	1·07	·88	4·96	54·67	4·08	899,191	·92	·95
Leyton	...	...	...	9·368	9·161	(c) 2·920	·871	1·543	1·714	7·048	75·092	5·374	2,911,345	1·037	1·615
Lincoln	381	...	...	10·24	10·05	2·21	·94	1·47	1·38	6·00	58·7	4·62	183,807	1·25	1·107
Liverpool ...	...	...	100,000	12·34	12·10	3·217	1·096	1·500	2·164	7·977	63·2	5·813	23,928,396	1·138	1·78
Lowestoft ...	...	...	...	8·5	8·3	2·50	·56	1·2	2·0	6·26	71·58	4·26	368,242	1·75	1·1
Maidstone ...	...	...	...	8·36	7·93	1·96	·82	1·19	1·55	5·52	69·58	3·97	365,309	1·25	1·236
Manchester ...	...	...	100,000	11·351	11·202	3·269	1·069	1·085	1·709	7·132	62·83	5·423	30,492,127	1·046	1·625
Nelson	1,889	...	...	12·29	12·23	2·89	·81	1·58	2·39	7·67	62	5·28	240,804	2	1·2
Newport (Mon.)...	...	...	...	9·557	9·310	2·542	·994	1·570	1·746	7·852	82·26	6·106	1,239,245	1·28	1·28
Nottingham ...	...	5,775	19,000	11·50	11·34	3·00	1·05	1·29	2·11	7·45	64·19	5·39	5,761,096	1·25	1·65
Oldham	...	2.135	...	12·946	12·645	3·016	·912	2·156	2·514	8·598	66·41	6·084	3,435,211	1·49	1·675
Perth	...	...	...	8·79	8·31	3·02	·66	·39	1·19	5·26	59	4·07	277,474	1·08	1·09
Plymouth ...	...	...	2,696	11·790	11·094	2·349	1·217	1·264	2·312	7·142	62·53	4·830	1,139,761	1·667	1·38
Pontypridd ...	355	...	...	12·16	11·99	2·78	·78	3·04	1·78	8·38	68·89	6·6	613,719	1·25	1·42
Rawtenstall ...	...	982	...	11·49	11·01	2·35	·92	1·49	1·78	6·54	56·69	4·76	734,781	1·38	1·33
Rochdale	7,423	5,904	...	11·019	10·980	2·524	·610	1·193	1·560	5·887	52·3	4·327	2,566,554	1·005	1·553
Rotherham ...	E. ... R.T 552	...	750 ...	12·56 10·36	12·50 10·36	2·86 2·35	·86 1·15	1·77 2·66	2·67 1·56	8·16 7·72	65·31 74·56	5·49 6·16	1,499,517 64,520	1·373 1·375	1·94 1·13
Salford	...	...	22,000	10·692	10·673	3·023	·729	·909	1·942	6·603	62	4·661	9,260,898	1·226	1·600
Southampton ...	7,118	...	...	10·411	10·044	3·037	·825	1·579	1·921	7·362	71	5·441	2,000,301	1·5	1·31
Southend-on-Sea	2,514	1,000	6,000	13·14	12·97	3·03	·85	1·33	2·33	7·54	57·35	5·21	848,538	1·75	1·33
Southport ...	...	...	...	9·595	9·381	2·454	1·186	1·475	1·808	6·923	72·1	5·101	513,285	1·5	1·185
South Shields ...	(d) 500	4,218	1,600	10·066	9·919	2·253	·885	·729	1·566	5·433	56·28	4·077	914,188	1·407	1·122
Stalybridge, &c.	...	...	...	7·880	7·729	2·686	·887	1·387	1·425	6·385	81·33	4·960	1,719,606	·9	1·584
Stockport ...	.	250	11,250	10·77	10·57	2·323	·592	1·152	·996	5·063	47·02	4·067	1,897,114	1·069	1·327
Sunderland ...	...	...	5,000	11·208	11·149	2·999	·741	·760	1·834	6·334	55·81	4·50	1,764,971	1·5	1·19
Wallasey ...	...	2,500	7,500	11·035	10·928	3·280	·823	1·083	2·028	7·214	65·3	5·18	1,827,115	1·4	1·45
Walsall	1,480	...	1,000	11·234	11·007	2·675	1·068	1·561	1·905	7·209	64	5·304	845 654	1·68	1·176
Walthamstow ...	...	...	...	7·92	7·76	3·07	·55	1·40	1·71	6·73	84·97	5·02	1,426,964	1·375	1·24
Warrington ...	1,481	...	1,500	12·398	12·237	2·954	·950	2·273	1·728	7·906	64·611	6·177	517,587	1·50	1·152
West Ham ...	...	...	...	9·43	9·329	3·554	·761	1·823	1·313	7·451	78	6·038	6,103,884	·75	1·72
Wigan	...	...	...	12·05	11·80	...	...	...	...	6·84	56·77	5·09	2,132,384	...	1·471
Wolverhampton	...	...	3,777	11·250	11·086	2·518	·854	1·507	1·393	6·272	55·75	4·879	1,620,970	1	1·388
Yarmouth (Gt.)...	1,062	...	...	8·605	8·425	2·655	·666	·938	1·564	5·823	67·95	4·259	655.315	1·60	·974

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

									*					Works Cost.	
Belfast	...	...	24,763	10·27	10·12	2·98	·55	1·31	·96	5·80	56·33	4·83	9,733,420	·589	1·40
Bexley	...	..	...	13·77	12·37	3·19	·73	2·20	1·1	7·22	66·6	6·12	405,140	1·1	1·52
Birkenhead ...	...	...	...	12·075	11·89	3·128	·779	2·016	1·141	7·064	58·49	5·923	2,490,715	·565	2·016
Bournemouth ...	...	10,321	...	12·24	12·20	2·85	·88	1·16	(b) 1·78	6·67	54·46	4·89	2,917,309	·583	1·55
Cardiff	3,980	...	9,400	12·014	11·83	3·449	1·026	1·409	·679	6·563	56	5·884	4,015,405	·438	1·54
Coventry ...	185	...	...	9·461	9·414	2·441	1·035	1·678	·668	5·822	61·6	5·154	1,533,212	·450	1·44
Glasgow	...	...	33,003	10·404	10·364	3·141	1·263	1·471	·495	6·370	57·88	5·875	32,280,346	·358	1·38
Huddersfield ...	...	13.370	6,590	11·04	10·73	2·70	·61	2·28	1·00	6·59	59·73	5·59	5,413,488	·42	2·27
Hull	...	1,435	12,000	9·42	9·33	2·82	·68	2·46	·67	6·63	71·04	5·96	4,855,082	·67	1·31
Leeds	...	...	61,375	11·229	11·120	2·985	·984	1·089	·776	5·834	51·95	5·058	16,461,894	·440	1·807
Leicester	...	...	10,000	9·801	8·785	3·232	·620	1·285	1·423	6·560	66	5·137	7,141,333	·411	1·77
London	...	...	...	H. 8·75 E.10·04	8·53 9·73	4·32 3·36	1·07 ·84	1·50 1·42	5·02 1·00	11·91 6·62	136·50 65·97	11·91 5·62	... 138,714,732	... ·619	... 2·62
N'castle-on-Tyne	...	21,189	12,000	11·958	11·451	3·238	·937	1·302	1·000	6·477	52·57	5·477	9,426,563	·394	1·972
Northampton ...	500	1,200	1,000	10·55	10·21	2·72	1·15	·93	1·34	6·14	58	4·80	934,509	·91	1·46
Portsmouth ...	11,374	(f) 3.000	4,000	12·229	12·035	3·220	1·136	·877	·582	5·815	47·55	5·233	2,599.210	·543	1·206
Preston	...	5,374	...	10·698	10·50	2·665	1·135	1·550	·600	5·95	55·63	5·35	1,516,545	·384	1·309
Reading	...	2,802	...	8·920	8·650	2·319	·970	·957	·880	5·126	57	4·246	1,033,313	·78	·99
Sheffield	...	7,032	37,716	10·760	10·665	3·367	·664	1·298	·847	6·176	57·389	5·329	16,500,208	673	1·837
Wellington, N.Z.	8,299	...	...	15·654	15·568	5·864	·755	2·222	1·694	10·535	67·3	8·841	4,921,406	·80	2·13

* The figures given under "Power" in Table II. include actual works costs only. H—Horse lines. E—Electric trolley system. (b) Including ·88d. per car mile current supplied by Bournemouth and Poole Supply Company. (c) Horse account ·033d. (d) Accident, insurance, and compensation fund. (f) Insurance fund. (i) Including Insurance.

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Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Population Served.	Traffic Records. Car Mileage.	Passengers Carried.	Passengers Carried per Car Mile.	Average Fare per Passenger.	Average Journeys per Head of Popular'n per Annum.	Average Car Miles per Day per Car.	Traffic Revenue per Mile of Single Track. £	Average Traffic Revenue per Annum per Head of Popular'n Served.	Operating Expenses per Passenger.	Average Distance of 1d. Fare.	Average Fare Charged per Mile.	Average Speed per Hour.	Average Total Car Hours per Day.	Average Number of Cars in Use Daily.	Number of Cars in Stock.
					d					d.	Miles.	d.	Miles.			
Aberdeen ...	165,000	1,738,966	19,990,711	11·49	·95	121·15	105·8	2,930	9/6	·519	1·69	·6	7·5	655	45	77
Accrington...	70,000	531,356	4,577,019	8·6	1·43	65·3	105	2,572	7/10	·81	1·07	·929	7·5	242	17	27
Ashton-u-L.	50,000	462,060	4,928,282	10·666	1·081	98·565	105	2,712	8/10	·584	1·223	·81	8	190	12	23
Ayr	33,000	385,986	3,880,850	10·05	·96	117	106	2,079	9 6	·558	1·25	·75	8	140	10	20
Birmingham	est.850,000	13,134,642	134,467,166	10·23	1·025	158	81·06	5,298	13/6	·66	2·34	·366	7·5	5,063	485	511
Blackburn ...	200,000	1,141,161	11,721,367	10·88	1·27	58·61	105	2,564	6/4	·87	1·25	·76	7·50	434	31	61
Blackpool ...	67,500	1,050,115	12,452,820	12	1·41	184·48	89·6	4,321	21/8	·765	...	...	8	...	32	72
Bolton ...	221,000	3,831,003	30,287,673	10·69	1·065	137·04	121·66	2,875	12/3	·588	1·468	·627	7·25	1,030	60	106
Bradford ...	354,000	5,971,561	62,005,976	10·383	1·086	175	113	2,703	15.11	·776	1·63	·504	7·3	2,232	144	242
Brighton ...	132,265	1,118,309	11,312,855	10	1·09	85·55	82·83	3,012	7/11	·84	1·27	·788	6·41	544	34	50
Burnley ...	175,000	1,449,647	15,949,359	11	1·18	91	95	3,620	9/1	·744	1·25	·83	7	760	40	57
Burton ...	48,000	437,106	3,188,655	7·30	1·082	66	...	1,684	5/10	·928	1·508	·58	7·5	...	...	20
Bury	128,202	1,599,872	15,132,553	9	1·07	118·03	102·33	1,957	10 6	·535	1·24	·85	8·56	506·64	42·71	54
Chester ...	39,028	346,645	3,067,815	8·85	·96	78·6	95	1,906	6/4	·626	1·27	8	7	150·60	10·04	18
Chesterfield	38,000	289,745	2,631,398	9·08	1·1	69	122	2,407	6/8	·728	1·38	·75	7·33	126	7	14
Colchester ...	44,160	323,524	1,871,866	5·79	1·32	42·39	89·3	1,295	4/8	1·06	·85	1·09	6·81	157·92	9·87	18
Croydon ...	170,451	2,657,824	20,504,143	7·74	1·06	120·29	125	4,734	10 7	·775	2·15	·50	7·92	915·82	58	75
Darlington...	58,000	381,920	3,791,835	9·9	·75	65·38	95·1	1,345	4/1	·557	1·219	·45	6·66	151·25	11	16
Darwen ...	40,611	252,710	2,755,011	10·91	1·24	67·83	...	1,989	7/-	·864	...	...	...	...	...	...
Derby ...	124,000	E 1,161,854	10,857,834	9·345	1·035	87·56	...	2,122	7/7	·707	1·44	·75	6·375	...	...	50
		H. 17,674	98,230	5·558	·962			...		1·36	1	1	...	...	...	3
Doncaster ...	52,000	516,840	5,072,172	9·81	·952	97·54	103	1,591	7/8	·652	1·25	·76	7·5	218	16	25
Dundee ...	165,000	1,359,821	17,734,162	13·04	·857	107	...	2,305	7/8	·533	2	·50	7·3	...	...	68
East Ham ...	130,000	1,375,433	17,775,698	12·92	·77	132	...	5,101	8 9	·61	1·80	·65	...	...	...	45
Exeter ...	48,660	433,507	4,110,513	9·48	·98	84·48	...	2,392	6/11	·612	1	1	6	...	16	20
Gloucester ...	53,972	628,946	4,200,432	6·7	·92	77	90·75	1,078	6/-	·78	1·5	·65	6·78	260·3	19	30
Halifax ...	176,000	2,152,391	19,456,923	9·04	1·27	110	79·5	1,912	11/11	·86	1·35	·84	6·8	814	74	95
Ilford ...	82,000	843,517	7,578,813	8·79	·831	92·42	...	2,312	5/1	·64	1·843	·69	8	...	...	26
Ilkeston ...	32,000	216,348	1,404,447	6·49	1·26	43·9	95	1,604	3·9	1·106	1·80	·633	7	93	7	13
Ipswich ...	75,300	668,025	5,554,585	8·31	·975	73·76	65·5	1,518	6/-	·75	1·53	·693	6·17	234·19	20·78	36
Keighley ...	43,000	242,500	3,099,272	12·8	·68	72·08	55·35	1,447	4/1	·462	2·22	·45	6·67	126	7	12
Kilmarnock	36,000	297,557	2,317,709	7·78	·879	64·38	90·05	1,537	4/8	·616	1·13	·86	7·22	112·58	9·05	14
Kirkcaldy ...	39,600	473,089	5,237,947	11·07	·719	132·27	59	1,786	7/11	·46	1·522	·64	7·5	195	15	22
Lancaster ...	41,414	171,475	1,461,104	8·52	·893	35	75	1,132	2·8	·854	1·71	·5	8	88·2	6·3	12
Leith ...	110,400	944,329	9,706,611	10·28	·87	87·92	125	1,926	6/3	·482	1·32	·72	8·3	311	20·66	37
Leyton ...	124,735	1,802,647	17,476,453	9·69	·945	140	112	3,719	11/-	·727	...	...	8	...	...	60
Lincoln ...	20,000	160,446	1,733,259	10·8	·92	86·66	64·08	2,264	6 8	·556	1·75	·428	7	90	5	8
Liverpool ...	839,000	13,442,605	144,085,927	10·72	1·129	172	77	5,695	16/2	·744	2·514	·39	7·5	4,920	480	595
Lowestoft ...	35,000	315,341	2,613,797	8	1·04	70	72	2,788	6/6	·764	1·6	·7	6·75	192	12	19
Maidstone ...	25,000	295,438	2,224,200	7·528	1·053	88·968	81	1,387	7/1	·73	1	1	6·7	128	12	19
Manchester	950,000	18,768,259	187,675,185	10	1·12	198	95·8	4,990	17/5	·713	2·368	·422	7·25	...	537	629
Nelson ...	45,000	200,996	2,776,785	13·82	·88	61·71	94·09	2,650	4/4	·555	1	1	5·50	108	6	11
Newport ...	87,626	968,067	9,251,181	9·56	·973	105·6	...	2,617	8/7	·821	1·75	...	...	...	37	44
Nottingham	260,000	3,485,789	38,484,032	11·04	1·02	148	92·08	4,514	12/8	·67	1·63	·65	6·86	...	104	135
Oldham ...	180,000	2,049,916	21,435,727	10·457	1·19	119·087	109·5	2,962	12/-	·822	1·115	·884	6·84	820	51·25	92
Perth... ...	35,900	252,940	1,813,228	7·16	1·15	50·5	96·25	1,298	4/7	·73	...	...	6·25	120	8	12
Plymouth ...	112,000	820,406	8,839,974	10·77	1·029	78·92	...	2,528	6/9	·663	...	...	...	...	...	42
Pontypridd...	40,000	432,006	5,047,168	11·68	1·02	126	81·2	2,509	10/9	·71	1·25	·51	6·5	221	17	26
Rawtenstall	50,000	553,813	4,949,775	8·93	1·23	98·72	126	1,600	10/2	·73	1·12	·88	9	198	12	24
Rochdale ...	130,000	1,749,967	13,740,152	7·91	1·38	105·7	114·90	2,008	12/4	·734	1·07	·90	7·66	645	43	69
Rotherham...	64,000	E 772,610	8,774,539	11·35	1·104	137·12	...	3,352	12,7	·719	...	...	...	...	...	...
	...	RT 56,887	191,088	3·36	3·08	...	...	...	...	2·3	...	...	...	...	...	...
Salford ...	350,000	5,854,830	50,113,120	8·559	1·243	143	111	3,425	14/10	·771	1·85	·55	7·853	2,075·18	144	200
Southampt'n	122,200	1,533,638	12,475,793	8·134	1·235	102	...	3,482	10 6	·90	...	...	...	...	...	70
Southend ...	78,000	637,366	7,581,104	11·89	1·09	97·2	87	4,708	8/10	·634	1·41	·76	6·5	357	21	31
Southport ...	31,312	433 068	4,401.336	10·63	·923	140·5	103	1,574	10/10	·68	1·6	·62	6·65	217·5	13·5	26
So'th Shields	110,513	814.212	8,456,688	10·386	·942	76·5	129·2	3,332	6/1	·545	1·825	·54	7·61	282	16	35
Stalybridge	92,933	1,088,545	8,896,836	8·123	·943	95·7	...	1,280	7/6	·779	1·275	·784	6·8	...	...	60
Stockport	120,000	1,429.396	11,544.225	8·0	1·39	96·20	78·32	2,290	10/5·9	·627	1·3	·7	7·5	471	29	53
Sunderland	170,000	1,474,637	16,972,537	11·5	·968	99·8	79·3	3,366	8/1	·550	1·34	·68	7	672	42	70
Wallasey ...	83,000	1,261,855	12,352,000	9·78	1·11	148·94	98·7	2,893	13/10	·99	1·89	·54	7	...	...	61
Walsall ...	100,000	719.372	6,121,381	8·509	1·293	61	86	1,885	6/7	·847	1·24	·79	7	345	23	39
Walth'mst'w	128,000	1,151,029	11,807,549	10·258	·756	91·89	93	2,968	5/11	·655	1·15	·89	7·2	408	36	58
Warrington	86,000	449,206	6,064,139	13·5	·906	70·513	102·533	2,372	5/4	·584	1·246	·803	6·408	192·048	12·003	21
West Ham..	294,200	3,544,292	40,200,347	11·34	·822	136	98	4,592	9 4	·65	1·80	·56	7·66	1,262·25	99	118
Wigan ...	200,300	1,449,188	13,018,833	8·98	1·314	65·1	105·5	2,309	7/2	·761	1·15	...	7·4	...	42	67
Wolverh'ton	135,000	1,168,239	11,913,122	10·198	1·08	88·25	87	2,510	8/-	·615	1·18	·879	6·85	622·2	36·6	49
Yarmouth ...	55,800	673.027	4,514,871	6·7	1·256	80·91	73·7	1,687	8/6	·868	1·25	·76	7	375	25	35

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast ...	385,492	5,946,659	58,437,942	9·82	1·07	151	128	2,539	13/-	·592	1·96	·43	8·75	2,256	141	282
Bexley ...	16,500	264,864	2,090,533	7·89	1·57	127	130	2,100	16/6½	1·16	1·59	·63	10	17	8	16
Birkenhead	130,832	1,235.277	13,622,361	11·02	1·077	104·12	68·64	2,540	9.4	·702	1·39	·66	6·61	511·73	49·30	59
Bournem'uth	120,000	1.882.054	15,750,576	8·36	1·45	131	95	3,214	16 -	·796	1·19	·87	6·80	1,140	60	81
Cardiff ...	182,729	2,614,901	28,365,277	10·84	1·09	155	98·25	4,062	14/1	·713	1·44	·736	7·5	1.120	70	130
Coventry ...	135,000	994.207	7,639,065	7·7	1·23	57	68	2,516	5·9	·757	1·18	·866	6·4	424	35	41
Glasgow ...	1,150,000	23,335,008	311,480,086	13·348	·776	270·85	105·49	5,139	17.6	·477	2·31	·44	8·13	8,484·59	606·04	843
Huddersfield	160,000	(a) 2,383,858	21,595,569	9·09	1·18	144	120	3,675	13·4	·728	1·39	·70	7·48	868·32	54·27	86
Hull	287,032	4,040.739	42.937.226	10·64	·877	149·80	127·10	5,141	10/7	·631	2·75	...	9	1,393·6	87·10	160
Leeds ...	500.000	8,795,465	89,668,185	10·2	1·088	179	113·35	3,594	16/3	(b) ·937	1·95	·539	7·48	3.190	213	232
Leicester ...	230,970	4,028,542	37,073,717	9·202	·954	161	...	3,985	12·9	·712	2·18	·984	8	...	...	130
London ...	...	H 1,058,481	11,550,504	10·93	·78	...	77·12	2,365	...	1·09	...	...	8·85	500·84	38	74
		E52,886,623	501,102,149	9·48	1·03	...	117·15	7,867	...	·69	...	...	8·82	16,427·36	1,237	1,661
Newcastle ...	300,000	4,780,662	52,204,974	10·92	1·082	174	...	3,738	15/2	·593	1·58	·633	7	...	...	192
Northampt'n	90,793	640.158	6.727.190	10·51	·97	76·53	...	2,974	6 -	·58	1·34	·7	6·91	...	...	26
Portsmouth	241.256	2,155.508	24,520,647	11·37	1·052	101·63	84	3,505	9/-	·511	1·66	·62	7	1,072	72	100
Preston ...	120,000	970,719	9,567,366	9·85	1·06	79·73	132	2,498	7.2	·603	1·01	·95	7·36	...	...	53
Reading ...	76,000	915.180	8,251,274	9·01	·97	108	97	2.505	8 8	·57	1·59	·68	7	352	26	36
Sheffield ...	466,408	8,071.188	96,330,242	11·935	·893	206·535	103·32	4.606	15 5	·517	2·62	·386	7·372	3,103·27	214·019	279
Wellington...	68,000	2,303.913	23,858,412	11·08	1·40	350	90	4.706	43/11	·94	1·112	·88	7·86	803	70	89

E—Electric trolley system. H—Horse lines. (a) Including 9,417 miles coal haulage. (b) Total expenses per passenger.

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rate of 3 per cent. on ordinary shares, leaving £1,352 to be carried forward. The expenses show an increase of £1,928, this being mainly due to the enhanced price of coal, heavy maintenance charges for permanent way, third-party accident claims, and the National Insurance Act. The company now have 9·89 miles of track open, and 35 cars.

Wolverhampton Corporation Tramways.—The results for the year ended March 31 show that there was a net increase in receipts of £2,481. The receipts were £56,444, as compared with £53,963 in 1913. The passengers carried amounted to 12,616,881, an increase of 703,759, and the mileage was 1,195,326, an increase of 27,087 miles. The receipts per car-mile amounted to 11·333d., an increase of ·247d. The particulars relating to the motor omnibus service are as follow:

	Miles Run.	Passengers Carried.	Total Receipts.	Receipts per 'Bus-mile.
1914	48,511	428,704	£2,071	10·241d.
1913	41,559	367,579	£1,711	9·878d.
Increase 1914	6,952	61,125	£360	·366d.

Gateshead and District Tramways Company.—After deducting £2,860 for renewals, writing off £1,537 for depreciation of investments, and adding £1,828 brought forward, the revenue balance for year ended December 31 was £27,987. The directors place £4,500 to reserve, £2,222 to sinking fund for redemption of mortgages, and recommend a final dividend on ordinary shares at rate of 6 per cent. per annum, making 5½ per cent. for the year, and, in addition, a bonus of 4s. per share, carrying forward £3,708. Holders of 94 per cent. of the total issued share capital accepted the offer of the Northern General Transport Company of December last for the purchase of the company's motor omnibus undertaking, and the profit on the sale has been transferred to reserve. Consequent upon fine weather and good trade in the district, the traffic receipts show a satisfactory increase of £5,867. The undertaking has in all respects been maintained, as in former years, in good order and repair.

Babcock and Wilcox, Limited.—The net profits for the past year were £446,073, and £64,013 was brought forward. A final dividend of 9 per cent. is proposed on ordinary shares, adding £150,000 to the reserve, £10,000 to the pension fund, and carrying forward £73,834. The report states that the trade continues to progress, and the directors are continuing to enlarge the scope of the business, in view of the fact that, under the present conditions of manufacturing, a larger output is required to keep up the profits.—Mr. J. H. Rosenthal, who presided at the annual meeting on April 23, stated that an interim dividend of 7 per cent. on the ordinary shares had been paid besides the 9 per cent. now recommended. Mentioning the £73,834 to be carried forward, he said a large reserve fund was essential to all who were engaged in manufacturing enterprises. The extra capital raised last year had been absorbed in the business. There was plenty of work in hand, and the prospects were in every sense satisfactory.

Anglo-Argentine Tramways Company.—The report of the directors for the year 1913 shows that the gross receipts amounted to £2,963,192, and the working expenses to £1,969,161. Adding the interest on investments and the balance brought forward from 1912, and deducting interest and municipal and other charges, there is a balance of £232,796. The interim dividend on the ordinary shares for the half-year ended June 30 amounted to £100,000, and from the balance the directors recommend that a final dividend be paid, which, with the interim dividend, will be equal to 6¾ per cent. on the total issued ordinary share capital of £3,250,000. This leaves £13,421 to be carried forward. The first subway line, Plaza Mayo to Plaza Once, where, at the terminus of the Buenos Ayres Western Railway, a joint underground station has been constructed, was opened on December 2, 1913, a distance of 2 miles 820 yards. The extension of this line to Caballito, where it will come up to the surface, will, it is hoped, be opened for traffic in August. The board specially desire to acknowledge the services rendered during the past year by the members of the local committee, the general manager, and the staff generally both at home and abroad.

Calcutta Tramways Company.—The revenue for 1913, including interest on investments and deposits, amounts to £113,271, which, with the balance brought forward, makes a total of £117,897. A final dividend of 7s. per share, making 9½ per cent. for the year, is proposed, transferring to reserve for depreciation, etc., £15,000, adding to the staff provident fund £1,215, and carrying forward £8,405.—The ordinary general meeting was held on April 22 at 1, Queen Victoria Street, E.C. Mr. E. C. Morgan, who presided, said that the year to December 31, 1913, constituted a record. To the capital expenditure there had been added the sum of £6,239, which was represented by the cost of the freehold land at Shambazar acquired for the turning loop, new plant installed at the power house for lighting purposes, six new trail cars, and workshop plant. The traffic receipts made a fresh record, the increase over the previous year amounting to over £10,000, directly attributable to the continued steady growth of the business. This was also the first year to elapse since the transference of the capital to Delhi. On the expenditure side of the revenue account there was an aggregate decrease of £6,523, due to reductions in power expenses, under fuel, and, under maintenance and repairs, in materials, consequent on the expenditure incurred on the overhaul of the plant in the previous year.

British Westinghouse Company.—At the annual meeting the chairman (Mr. J. A Bryce, M.P.) said that since the last meeting the scheme for the reduction of capital had been sanctioned by the Courts. The net profits for the year amounted to £106,493, against £41,074 in 1912, £20,708 in 1911, and £12,436 in 1910. In 1909 there was a loss of £798, and in 1908 a loss of £7,445. After providing for debenture interest, etc., the directors had placed £50,000 to reserve, and recommended a dividend at the rate of 5 per cent. on preference shares, carring forward £6,493. Perhaps the most important order secured by the company was that from the London and South Western Railway Company for train equipments in connection with the electrification of their suburban traffic. After securing judgment in their favour in the House of Lords on their claim against the Underground Electric Railways, the matter had to go back to the Hon. A. Lyttelton, the arbitrator. The Hon. A. Lyttelton died, and the matter was then compromised. The company saved something like £70,000 or £80,000, and instead of having to pay all the costs of the proceedings from the commencement they secured a large part of the costs. Altogether they lost from the whole business about £52,000. Some 10 or 12 years ago they were doing a large business, but none of it profitable, but now all their business was of a profitable character.

Brush Electrical Engineering Company.—After providing for the general charges, etc., and interest on the debenture stocks, there remains a net profit of £20,061 for the year 1913. The directors recommend that the profit be applied as to £12,351 in writing down the property account to provide for depreciation in respect of the last two years, and as to the balance of £7,709 in reduction of the amount standing to the debit of profit and loss account.—Mr. E. Garcke, presiding at the annual meeting on April 20, said that the result of the trading was due mainly to the extraordinary efforts of the general manager and his able staff. The scheme for the reduction of the share capital, which was approved in 1912, would now be proceeded with. The effect of the scheme was to reduce the preference shares to the nominal value of 7s. and the ordinary shares to 5s. each, both classes of shares to rank alike, and to be converted into one common denomination. They had made good progress with the arrangements for the manufacture of the Ljungstrom turbine. On the rolling stock side they had been pretty busy, and had carried out important contracts for the underground railways of London, the Great Indian Peninsular Railway, etc. They had also turned out a large number of motor omnibus bodies for the principal London and provincial companies. A gratifying feature had been the revival in the demand for electric tramcars.

London Rating Appeal.—In the Court of Appeal on April 8 judgment was given in an appeal by Islington Assessment Committee against a judgment of Justices Bray and Lush, who had granted the London County Council a rule *nisi* calling upon the committee to appoint a valuer to make a provisional valuation list, showing the reduction in the rateable value of the tramways in Islington owing to the competition of motor omnibuses. In 1912 and 1913 the gross receipts from tramways had fallen from 11·42d. per car-mile to 9·05d. The Borough Council declined to accede to a requisition to appoint a valuer on the ground that there was no *prima facie* evidence of such a reduction as was contemplated by section 47. The Divisional Court held that section 47 referred to an increase or reduction during the year in which the requisition was made, and did not mean an increase in, or reduction from, the amount appearing in the quinquennial valuation list. By a majority the Court of Appeal held that the condition precedent to making an order for the appointment of a valuer was that there should be shown either an increase or decrease in fact of the rateable value of the assessment, and that it was not sufficient to come and say the receipts from competition had become less, and therefore there was a *prima facie* cause shown for a revaluing for the purposes of assessment to rates. In that view the decision of the Divisional Court was wrong, and the appeal should be allowed, and the rule discharged. An application for a stay pending an appeal was refused.

TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION.

ANNUAL CONGRESS.

The April issue of the journal of this Association notifies that the annual congress will be held on Thursday and Friday, July 16 and 17, at Newcastle-on-Tyne. Among the contents of this month's issue are the report of the Departmental Committee on Local Taxation; the award of Mr. A. J. Ram, K.C., the arbitrator on the question of the purchase price of the Colne Light Railway Company; the decision of the Light Railway Commissioners in the application with reference to the Dearne Valley Light Railways; and extracts from the report of Mr. J. M. McElroy on "The Passenger Transportation Problem."

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TRAMWAY AND OMNIBUS SHARE LIST.

Specially Compiled for "The Tramway and Railway World."

Amount Ranking for Dividend.	Shares.	Name.	Div'd. Prev. Half-year.	Div'd. Last Half-year.	Quotations, Apr. 30.	Movement Since April 4. Rise.	Fall.	Latest Business Done. Price.	Date.	Yield on Buying Price. £ s. d.	Dividend Due. (Final in Italics.)	Quotations, Jan., 1908, to Apr. 30, 1914. Highest	Lowest
640,000	5	Anglo-Argentine Tramways 5½% Cum. 1st Pref.	2/9	2/9	4¼—4⅛	...	...	4⅛	April 29	5 14 3	Jan., Dec.	5⅛	4⅛
500,000	5	Do. do. 5½% Cum. 2nd Pref.	2/9	2/9	4⅛—4⅜	...	...	83/9	April 30	6 1 3	June, *Dec.*	5⅛	4⅛
1,500,000£	...	Do. do. 5% Deb. Stock Red.	5%	5%	96½—98⅛	...	...	97½	April 30	5 1 6	June, Dec.	105½	95½
325,532£	Stk.	Auckland Elec. Trys. Co. 5% Mort. Deb. ..	5%	5%	103—106	...	...	105	April 27	4 14 6	Jan., July.	107	99½
75,000	1	Bath Electric Tramways 5% Cum. Pref. ...	6d.	6d.	⅜—⅞	...	...	10/6	Mar. 3	7 5 6	*Jan.* & July	⅞	⅝
334,696£	Stk.	Birmingham Dist. Pow. & Tract. 4½% 1st Deb....	4½%	4½%	85—87	+ 1	...	86	Feb. 12	5 4 6	Jan., July.	96	77
15,000	10	Blackpool and Fleetwood Tramways	4/-	13/-	14–15	+ ½	...	14	April 18	5 13 6	Feb., Aug.	16	12
60,000	10	Bombay Elec. Supply & Trys. Co. 6% Cum. Pref.	6/-	6/-	10⅜—11½	...	...	11	Mar. 11	5 7 3	Feb., Aug.	12	7⅞
1,003,614	$100	Brazil Traction...	6	6	78½—80½	...	— 4½	80⅜	April 30	7 13 0	Fb.My.Ag.Nv.	105½	77
75,000	5	Brisbane Elec. Tramways Investment Co. Ord.	4/-	4/-	7½—8	...	...	7⅞	April 30	5 0 0	*May*, Oct.	9½	3⅞
75,000	5	Do. do. do. 5% Cum. Pref.	2/6	2/6	4⅞—5⅜	...	...	5 7/32	April 21	4 13 0	*May*, Nov.	5⅜	4⅜
50,000	10	Bristol Tramways and Carriage Co.	4	5	6⅜—7	...	...	5½	Oct. 29	6 8 9	*Feb.*, Aug.	14½	5
50,000	10	Do. do. do. 4% Cum. Pref.	4	4	7½—7⅝	+ ⅜	..	6⅝	Nov. 21	5 6 9	Jan., July.	9½	6½
800,000£	Stk.	British Columbia Electric Railway Def. Ord...	8%	8%	112—116	...	— 5	113½	April 29	6 18 0	May, Nov.	156	99½
800,000£	Stk	Do. do. Pref. Ord.	6%	6%	104—108	...	— 1	106½	April 30	5 13 3	Feb., Aug.	132½	99
800,000£	Stk	Do. do. 5% Cum. Perp. Pref.	5%	5%	102—105	+ 1	...	103	April 30	4 16 3	Jan., July.	114	98
1,070,097£	Stk.	British Electric Traction 6% Prefd. Ord. ..	...	...	15½—17½	...	...	16	April 22	...	Apr., *Oct.*	18	8
403,503£	Stk.	Do. do. 6% Cum. Pref. ..	6%	6%	88—91	...	— 1	89½	April 30	6 15 0	Feb., *Aug.*	95½	73
1,464,245£	Stk.	Do. do. 5% Perp. Deb. ...	5%	5%	93—95	...	...	93⅜	April 28	5 5 3	April, Oct.	101	82½
439,796£	Stk.	Do. do. 4½% 2nd Deb. Red. ...	4½%	4½%	77—80	...	— 2	81	April 18	5 12 6	May, Nov.	84	58
246,625£	Stk.	Buenos Aires Port & City Trys. 6% 1st Mt. Deb.	6%	6%	73—78	...	...	71	Mar. 24	7 14 0	Feb., Aug.	103	61
623,270£	Stk.	Buenos Ayres Lacroze Trys. Stg. 5% 1st Mt. Deb.	5%	5%	99½—101½	...	— ½	99½	April 30	4 18 6	Mar., Sept.	103	89
137,610	5	Calcutta Tramways Ord.	2/6	7/-	6⅛—7 1/16	+ 1/16	...	7 1/16	April 27	6 12 3	*Apr.*, Oct.	7⅜	4
47,295	5	Do. 5% Cum. Pref.	2/6	2/6	5—5⅛	...	...	5	April 23	4 15 3	Jan., July	5⅜	4⅜
491,222	1	Cape Electric Tramways	1/-	for '12	⅜—½	...	...	14/-	April 29	6 13 6	Feb., *Nov.*	⅝	⅜
15,000	10	Carthagena and Herrerias Steam Tramways ...	4/-	May, '13	3—3⅜	...	...	62/6	Mar. 3	5 6 9	April.	7	3
248,000	5	City of Buenos Ayres Tramways (1904) ...	2/6	2/6	5½—5⅝	...	...	5 1/32	April 29	4 11 0	Fe My.Au No	6	5⅛
120,000£	Stk.	Colombo Elec. Trys. & Ltg. 5% 1st Mt. Deb. ...	5%	5%	87—91	...	— 2	90	Jan. 7	5 10 0	May, Nov.	101	87
11,500	10	Cork Electric Tramways and Lighting Co. ...	...	6/- ann.	4—4½xd	+ 1/0	...	4 3/8	Dec. 23	6 13 6	*Mar.*	10	4
12,327	10	Do. do. do. 5% Cum Pref.	5/-	5/-	6⅜—7	...	...	6⅜	Jan. 29	7 3 0	Jan., July	10½	6½
3,000	10	Dublin and Lucan Elec. Railway 5% Cum. Pref.	5/-	Nil	6—7	...	...	9	Aug. 25/10	..	Sep.15, Mar.15	9½	6
60,000	10	Dublin United Tramways Co. (1896), Ltd., Ord.	6/-	5/-	10½—11	...	— ¼	10¼	April 29	5 0 0	Feb., Aug.	14	10⅜
60,000	10	Do. do. do. 6% Cum. Pref.	6/-	6/-	12⅜—12½	...	— ¼	12 1/16	April 30	4 18 0	*Feb.*, Aug.	14	11½
13,500	10	Gateshead & District Trys. Co. Ord.	5/-	11/-	8½—9	...	— ½	9	Jan. 7	8 18 0	*Mar.*, Sept.	9½	7⅞
268,235	10/-	Hastings and District Elec. Trys Ord.	...	...	⅞—1	...	...	1/3	April 17	...	...	1 3/16	1 3/16
80,000	1	Do. do. 6% Cum. Pref. ...	6%	6%	1/16—1⅛	...	...	10/9	April 17	8 14 6	...	1 3/16	1 3/16
125,000£	Stk.	Do. do. 4½% Deb. Stk. Red.	4½	4½	65—70	...	...	65	April 15	6 8 9	April, Oct.	100	65
$9,631,000	$1,000	Havana Elec. Rly. Co. Con. Mort. 5%	5%	5%	93½—97½	...	...	97½	April 23	5 7 6	Feb., Aug.	105	80
195,000£	100	Hong Kong Tramways Co. 5% Mt. Deb. ...	5%	5%	86—90	...	...	87	Feb. 9	5 12 6	May, Nov.	92	75½
20,000	10	Imperial Tramways Ord.	Nil	4% year	3—3½	...	...	3	Mar. 4	11 8 9	Feb., Aug.	9⅜	2½
20,000	10	Do. 6% Cum. Pref.	...	6% year	6½—6⅝	...	...	6 3/32	Ju. 28/09	8 18 0	Jan., July.	9¼	2⅜
30,000	5	Isle of Thanet Elec.Try.& Ltg. Co.5% Cum. Pref.	2/6	Dec. '12	2—2½	...	...	46/3	April 20	6 0 0	*Mar.*, Sept.	3	0⅞
250,000	1	Kalgoorlie Electric Tramways	...	...	0—1/16	...	...	1/-	Jan. 15/12	...	*May*	1/16	0
170,000	1	La Plata Elec. Trys. Co. 6% Cum. Pref. ...	0/4·80	0/7·20	31/32—1	...	— 1/32	17/-	Oct. 14	6 3 9	*April*, Oct.	1 1/16	0½
30,800	10	Lanarkshire Tramways	6/-	6/-	9½—10½	...	...	10 1/16	Feb. 18	6 2 0	Feb., Aug.	10⅞	9⅜
250,000£	Stk.	Lancashire United Trys. 5% Prior Lien Deb....	5%	5%	87—89	...	...	87½	April 25	5 14 0	Jan., July.	95	76
634,026	1	Lisbon Electric Tramways Ord.	7¼d.	7¼d.	1 1/16—1 1/16	...	...	22/3	Aug. 25	4 11 6	*July.*	1 3/16	1/16
425,553	1	Do. do. 6% Cum. Pref ...	7¼d.	7¼d.	1 1/16—1 1/16	...	...	23/-	Mar. 10	5 13 0	Jan., July.	1¼	1/16
1,666,673	1	London and Suburban Traction Ord.	...	...	1/16—3/32	...	— 0/3 3/4	4/3	April 28	...	...	3/16	4/3
1,316,268	1	Do. do. do. 5% Cum. Pref.	...	5	⅛—¼	...	— ¼	10/6	April 28	8 0 0	Feb., Aug.	⅜	10/6
1,000,000£	Stk.	London General Omnibus 4½% 1st Deb.	4½	4½	98½—100½	+ 1	...	99 3/4	April 29	4 10 6	Jan., July.	98½	92¼
1,000,000£	Stk.	Do. do. 5% Cum. Income ...	5	5	89—92	...	...	90¾	April 29	5 8 9	Feb., Aug.	95	85½
1,649,930£	Stk.	London United Tramways 4% 1st Deb. Stk. ...	4	4	56—60	...	— 4	59	April 20	6 13 6	*Jan.*, July.	82	54½
63,430£	Stk.	Madras Elec. Trys. (1904) Ltd. 5% Deb. Red. ...	5%	5%	101—103	...	...	101½	Oct. 16	4 17 3	Jan., July.	105	86
20,000	5	Do. Do. Do. 6% Cum. Pref. ...	...	...	4⅛—5½	...	...	5 7/32	Mar. 12	5 14 3	Ma., Sept.	5⅜	87/6
300,000£	100	Manaos Trys. & Ltg. Co. 5% 1st Debs.	5%	5%	78—81	...	...	81	Feb. 20	6 5 9	Jan., July.	97	79
$4,785,000	$1,000	Manila Elec. R. R. and Ltg. Corp. 5% Gld. Bds.	5%	5%	98½—100⅛	...	...	99½	April 15	5 2 0	Mar., Sept.	104⅜	84
60,000	1	Mansfield & District Trys. Ltd. 6% Cum. Pref.	7¼d.	7¼d.	1/16—1 1/16	...	...	18/6	Sept. 24	5 13 0	Mar., Sept.	1 1/16	⅜
$20,000,000	$100	Mexico Tramways Common Stock	$3½	$3½	65—69	...	— 7½	66	April 30	...	Fb.My.Au.No	151½	59
$3,840,000	...	Michigan Untd Rys. Co. 5% 1st Debs & Refdg Bds	5%	5%	91½—93½	...	...	91¾	Mar. 9	5 7 0	May, Nov.	101½	89½
600,000£	100	Montreal Street Rly. 4½% Ster. Debs.	4½%	4½%	98—100	...	...	99½	Mar. 2	4 10 0	Fe.My.Au.No.	107	97
150,000	1	National Steam Car	6%	year	⅜—½	...	— 1/16	14 6	April 30	8 0 0	Dec.	39/9	13/3
5,000	10	Oldham, Ashton, and Hyde Elec. Tramways Ord.	5/-	7/-	5½—6½xd	+ 9 6	...	7	Apr.2/13	5 12 0	Mar., Aug.	9⅜	5⅜
5,000	10	Do. do. do. 5% Cum. Pref.	5%	5%	6—6⅜	+ ⅛	...	6 1/16	April 17	7 13 9	Feb., Aug.	8⅜	6 1/16
77,893	5	Para Elec. Rly. and Ltg. Co., Ord.	5/-	5/-	3⅞—4⅛	...	...	4	April 3	11 8 6	May, Nov.	8	4
100,000	1	Perth (W.A.) Electric Tramways Ord.	6d.	7½d.	...	...	...	25/6	Nov. 8/12	...	*Sept.*, Nov.	26/10½	⅜
245,000	1	Potteries Electric Traction Ord.	3½	for '12	⅜—½	...	...	7/6	Mar. 7	7 0 0	April.	⅝	⅜
245,000	1	Do. do. 5% Cum. Pref. ...	6d.	6d.	1/32—3/32	...	...	11/3	April 17	7 12 6	*Feb.*, Aug.	¼	1/16
124,560	1	Provincial Tramways Ord.	8d.	1/-	1/16—1/8	...	...	19/6	April 22	8 17 9	May. *Nov.*	1 1/16	13/-
10,000	10	Do. do. 6% Cum. Pref.	6/-	6/-	10—10½	+ ⅛	...	10 1/16	April 21	5 17 3	June, *Dec.*	11	9
50,000	5	Rangoon Elec. Trys. & Supply Co. 6% Cum. Pref.	3/-	3/-	5—5⅛	...	...	5	Mar. 12	5 9 3	June, Dec.	6	5
32,000	10	Shanghai Elec. Construction Co.	10/-	year	12¾—13½	...	...	13	April 2	3 18 6	May.	13 1/16	6
330,400£	Stk.	Singapore Elec. Trys. Ltd., 5% Debs. Red. ...	5%	5%	88—92	...	...	89	April 2	5 8 9	Mar., Sept.	91½	61
169,570	1	S. Metrop'n Elec. Trys. & Ltg. Co. 6% Cum. Pref.	1/2½	May, '13	⅛—¾	...	...	15/9	May 16,'12	8 0 0	Feb., Aug.	1⅛	⅝
91,720£	Stk.	Southern Elec. Trys. of B.A., 1st Mt. Deb. ...	5%	5%	95—97	...	...	96¾	Mar. 3	5 3 3	Feb., Aug.	100⅜	90
471,500£	100	Toronto Rly. Co. 1st Mt. 4½% Stg. Bonds ...	4½%	4½%	97—99	...	— 1	98	April 27	4 11 6	Feb., Aug.	104	97
80,000	5	United Elec. Tramways of Monte Video, Ord....	4/-	3/-	4⅜—5⅛	...	...	97/6	April 17	6 16 9	*June*, Dec.	6¼	4⅜
90,000	5	Do. do. do. 6% Cum. Pref.	3/-	3/-	4⅛—5⅜	...	...	98/9	Mar. 20	5 14 3	June, Dec.	6⅜	4 1/16
500,000£	Stk.	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Debs.	4½%	4½%	93½—95½	...	...	94¾	April 22	4 14 3	Apr., Oct.	109½	94½
40,977	5	Yorkshire (West Riding) Elec. Trys. Ord. ...	...	...	1/16—⅛	...	...	7/6	Feb. 4	...	*Mar.*	1⅛	⅛
46,261	5	Do. do. do. 6% Cum. Pref	1/6	2/6	4¾—4⅞	+ ⅛	...	89/4¼	April 29	4 2 3	*Mar.*	4⅜	1⅜

ELECTRIC RAILWAY STOCKS.

1,854,720£	Stk.	Central London Ord. Stock (4% Guar.)	...	4	82—84	+ 1	...	82½	April 30	4 15 3	*Feb.*, Aug.	89½	59⅜
572,640£	Stk.	Do 4% Guar. Pref. Stock	4	4	83—85	+ 1	...	84¼	April 27	4 14 3	Feb., Aug.	92	80
572,640£	Stk.	Do. Deferred Stock (4% Guar.) ...	...	4	80—82	+ 1	...	82	April 30	4 18 9	Feb., Aug.	91⅜	42
50,000	10	Liverpool Overhead Ord.	2/6	3/6	4½—4⅝	...	...	86/3	April 29	6 13 6	*Feb.*, Aug.	4¼	⅜
1,412,263£	Stk.	Mersey Cons. Ord. Stock	Nil	Nil	5¾—6½	...	— ¾	6	April 27	...	*Feb.*, Aug.	8	1
5,732,062£	Stk.	Metropolitan Cons.	1½	1½	41—41½	...	— 1½	41½	April 30	3 18 6	*Feb.*, Aug.	75⅜	34
2,640,914£	Stk.	Do. Surplus Lands Stock	2½	2½	63—65	...	...	63½	April 22	4 4 9	*Feb.*, Aug.	72	58
3,235,000£	Stk.	Metropolitan District Ord.	Nil	Nil	26½—27½	...	— 2½	27½	April 30	...	*Feb.*, Aug.	51½	9½
500,000	10	Underground Electric Railways Co. of London	...	...	3⅜—3⅝	+ ⅛	...	65/-	April 29	...	...	5 1/16	1⅜
1,730,000£	...	Do. 4½% Bonds of 1933	4½%	4½%	99½—101½	+ ⅜	...	100½	April 29	4 9 6	Jan., July	102	73
1,192,707£	...	Do. 6% 1st Income Debs.	6%	6%	114—116	+ 2	...	115	April 30	5 3 6	Mar., Sept.	118	108
6,120,750£	Stk.	Do. 6% Income Bonds	60/-	60/-	90—91	...	...	90⅝	April 30	6 12 0	Mar., Sept.	97½	18
1,150,477	1/-	Do. "A" Ord.	...	...	1/16—⅛	+ 1/16	...	9/3	April 30	...	...	⅜	⅜

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PERSONAL.

Mr. W. Fraser has been appointed station superintendent at Barking electricity works.

Mr. Manley has been appointed assistant manager of the South Metropolitan Tramways and Electric Lighting Company.

Mr. T. B. Goodyer, general manager of the Croydon Corporation Tramways, has been voted an increase in salary to £550.

Mr. B. Sankey, late borough electrical engineer at Whitehaven, has been appointed to a similar position at Port Elizabeth, South Africa.

Mr. H. P. Stokes, electrical engineer and tramways manager to the Bexley Urban District Council, has had his salary increased by £100 per annum.

Mr. F. W. Mills, chief electrical engineer to the South African Railways at Johannesburg, has been granted leave of absence to September 8 next.

Mr. F. W. Dingley has been appointed superintendent at Crewe of the road motor vehicle department of the London and North Western Railway Company.

Chief Inspector Garrett, for 11 years with Lowestoft Corporation Tramways, has been appointed inspector to the Erith Council tramway undertaking.

Mr. F. E. Pillar, accountant of the Carthagena and Herrerias Steam Tramways Company, has been appointed secretary, in place of Mr. R. J. Fennesey, resigned.

Mr. A. Harman, engineer in the repair works of Aberdeen tramways, has been presented with a case of pipes on leaving the department to take up a position with a local firm.

Mr. A. Redfern, assistant electrical engineer at Darlington, has been presented by the staff with an oak writing desk on the occasion of his departure to take another appointment.

Mr. J. L. Harper, administrator-general of the Argentine North Eastern Railway Company, has resigned that position, which will be provisionally occupied by Mr. S. Comminges.

Sir Salter Pyne is on a tour in India in the interests of the R.E.T. Construction Company, for whom Messrs. Gladstone, Wyllie, and Company, Calcutta, are the agents in India.

Messrs. J. Telfer and F. V. L. Mathias, general manager and electrical and tramways engineer respectively, Warrington Corporation Tramways, have been awarded increases of salary.

Mr. T. R. Ryan, formerly traffic manager of the Mexican North Western Railroad, has been appointed general director of traffic of the Brazil Railways, with head-quarters at Sao Paulo.

The late Sir Frank Ree, general manager of the London and North Western Railway, left estate of the gross value of £26,961, of which the net personality has been sworn at £18,114.

Mr. S. Joyce Thomas has been appointed a member of the Highways Committee of the London County Council in succession to Mr. H. Lidiard, who has resigned his position on the committee.

Commissioner McClelland, of the Victorian Railways, has recently enjoyed the first vacation which he has had for 14 years. His absence only extended over five weeks, and he paid a visit to New Zealand.

Mr. E. Goulborn, assistant district traffic superintendent at Abergavenny, has been appointed district traffic superintendent of the Swansea and Central Wales District of the London and North Western Railway.

Mr. E. Morton, charge engineer at Whitehaven Council's electricity works, has been presented with a suit case and a slide rule on leaving to take up an appointment with the Mersey Railway Company at Birkenhead.

Sir Charles J. Owens, a director of the London and South Western Railway, has been re-elected chairman of the Committee on Railway Subjects for the ensuing year at the London School of Economics.

Mr. J. Hessenmuller, chief accountant and sub-manager of the Argentine Railway Company, has been appointed general manager of the Paraguay Central Railway Company in succession to Mr. F. Fraser Lawton, who is retiring.

Sir Henry Kimber was re-elected a director of the Calcutta Tramways Company at the annual meeting. Sir Henry, who is also chairman of the South Indian Railway Company, was referred to as a most useful member of the board.

Mr. C. B. Smith, electrical engineer, Hove Electric Lighting Company, has been retained by Hove Corporation as electrical engineer on the acquisition of the undertaking by the municipality. The Corporation will shortly install a railless trolley car service.

Mr. A. E. Wray, late assistant manager of the South Metropolitan Tramways Company, has taken up the duties of his new appointment as manager and engineer of the Gravesend and Northfleet Tramways Company and the North Kent Motor Omnibus Company.

Mr. G. H. Pearson, assistant manager of the carriage, wagon, and timber departments of the Great Western Railway works at Swindon, has been appointed assistant locomotive, carriage, and wagon superintendent at the Ashford works of the South Eastern and Chatham Railway.

Mr. E. E. Moseley has been appointed manager of Todmorden Council's motor omnibus undertaking at a salary of £160. There were 39 applicants. Mr. Moseley has held appointments with the Utility Motors, Limited, and the Eastbourne Corporation omnibus department.

Mr. F. Heppenstall has resigned the position of manager of the switchgear and transformer department of Messrs. Johnson and Phillips to take up an appointment with the General Electric Company, Limited, 67, Queen Victoria Street, E.C., where he will devote his attention to wires and cables.

Mr. Alfred de Rothschild has again given an annual donation of £100 to the funds of the St. Mark's Traffic Workers' Brotherhoods of the United Kingdom. In the April issue of the magazine the Rev. Dr. Darlington announces that the badge is now being worn by members engaged on the National Steam omnibuses.

Mr. W. Jenson, manager of the Chatham Tramways Company, was boarding a car at the motorman's platform on April 25, when he was knocked down by another car proceeding in the opposite direction. He was conveyed to the hospital, where he was found to have sustained a dislocated shoulder, a broken wrist, and a severe scalp wound.

Mr. J. R. Lynch, who has left England to take up the position of assistant traffic manager of the Federated Malay State Railways, started his career with the Midland Railway at Liverpool. Following service with the Great Central he became, in 1910, secretary to the President of the Manila Railway, and later he held an appointment at Vancouver.

Mr. Nogués, director-general of Argentine Railways, who had been making a tour in Europe, sailed for Buenos Ayres on March 25 In London he was entertained at a banquet by the directors of the Buenos Ayres Southern, Western, and Pacific Railways. Mr. Nogués is reported to have been much impressed with the obvious difficulties of raising fresh capital on the London market at present for foreign railways.

Messrs. T. B. Molomby and E. B. Jones, members of the Melbourne Suburban Railway Electrification Board of the Victorian Railways, have left on a visit to England. Their object is to acquire information which will assist in the working of the railway when electrified. Before their departure they were entertained at dinner by their colleagues on the Electrification Board, of which Mr. Bracher is the secretary.

Messrs. T. E. Pallant and W. P. Allen, the joint general managers of Calcutta Tramways Company, the latter also being the chief engineer, were, together with the staff, complimented by Mr. E. C. Morgan, chairman, at the annual meeting on April 22 They had, he remarked, largely contributed to bringing about the excellent result of the past year's trading. The meeting passed a resolution expressing appreciation of the work of the officers and staff.

Motorman Scott, of the Mexborough and Swinton Tramways Company, has been appointed depot inspector. He has also served on the Dewsbury, Halifax, and Scarborough tramways, and he has service in the Army to his credit, including the Tirah expedition and the South African war. For the latter campaign he received the Queen's and King's medals. In 1907 he was awarded the Royal Humane Society's certificate for rescuing a woman from drowning at Rotherham.

Mr. A. Carlyle, a conductor on a London County Council tramcar, running between Abbey Wood and the Embankment, was thanked by Sir John Dickinson at Bow Street Police Court for his brave conduct in going to the rescue of a woman who had jumped into the Thames at Westminster Bridge on April 12. Carlyle left his car, and, although only able to swim about a hundred yards, he seized a lifebelt affixed to the Embankment, swam to the woman, and held her up till a boat arrived.

Sir Robert Turnbull, who is acting as general manager of the London and North Western Railway until the arrival of Mr. Guy Calthrop from Buenos Ayres this summer, was the recipient of a presentation from the Superintendents' Conference of the Railway Clearing House held on April 22. Sir Robert was presented with an old oak bookcase to mark his approaching retirement from the Conference; Mr. Clow (Great Central Company), chairman of the Conference, made the presentation on behalf of the subscribers. Mr. Cockburn (Glasgow and South Western), Mr. Watson (North Eastern), and Mr. Addington (Great Western) expressed regret at parting from Sir Robert.

Mr. E. Carden's work as general manager of Dover Corporation Tramways was defended by Councillor E. Chitty, the chairman of the committee, on a proposal to reduce the tramway estimates by £100. It was at Mr. Carden's suggestion that they installed meters on the cars, which had effected a saving in current consumed. Comparing the figures for 1911-12 with this year's the sum of £1,400 for current had been saved, Sir A. M. Bradley pointed out that the price of current

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could not be reduced as the Electricity Committee had to keep the price up in order to meet their expenditure. Finally it was agreed that a sub-committee of the Tramways Committee should consider the whole question of the tramways.

Mr. Dane Sinclair, general manager of the British Insulated and Helsby Cables, Limited, and his staff, were referred to at the annual meeting of the company by the chairman, Dr. Muspratt, who mentioned that the company had in hand two important contracts connected with the electrification of the London and North Western Railway and the Melbourne Suburban Railways. The good results for the year, he observed, could not have been achieved without the hard and intelligent work of the general manager and the most loyal co-operation of the other principal officials of the company. Owing to the insufficient supply of workmen's dwellings at Prescot, and the long distance the men had consequently to travel daily, the directors were contemplating the development of a site near the works on town planning lines.

Mr. A. W. Szlumper, who has been appointed chief engineer of the London and South Western Railway, has been district engineer for the London division since 1897. He entered the company's service in 1883, and was first engaged in examining and calculating the strength of the bridges with a view to running heavier engines. He had charge of the widenings in the London district and the reconstruction of the bridges over Vauxhall and Westminster Bridge Roads and the Barnes Bridge, as well as reconstruction of stations. In 1881-3 Mr. Szlumper was on the engineering staff of the Great Indian Peninsular Railway, and in 1879-81 he was with the South Eastern Railway. He is a Welshman, and was articled to his brother Sir James W. Szlumper, who was engaged in railway construction in this country.

Mr. A. Young, the chief valuer to the London County Council, retires from that post next November, after 25 years' service. In recognition of the great amount of money which he has saved to the ratepayers, the Council have for pension purposes added 10 years to his period of service. The Government obtained the loan of his services during the arbitration with the National Telephone Company. Mr. Young valued and bought up 407 miles of tramways from the companies, and 2,500 acres for parks and open spaces. His estimate of six millions sterling for the acquisition of the streets upon which Aldwych and Kingsway have been erected, above the tramway subway, was not exceeded, and now that nearly all the land has been sold the Council are likely to recoup themselves to the extent of four and three-quarter millions, in accordance with his original estimate.

Mr. W. H. Hyde, late general manager of the Great Eastern Railway, has been entertained to dinner by the principal and district officers of the company, and on behalf of his colleagues Mr. Busk, the Continental traffic manager presented him with a gold watch, a bronze statuette on a pedestal, a set of Sevres vases and a handsome diamond pendant for Mrs. Hyde. Mr. Busk referred to Mr. Hyde's bonhomie and sunny temper under all circumstances, and expressed the hope that the holiday he was about to take would restore him to complete health. Mr. Hyde, in thanking the officers, said that it was not possible for anyone to have more willing assistance and co-operation than they had always afforded him. A further presentation was made to Mr. Hyde by the members of his office staff in the shape of a silver rose bowl. Mr. Hyde expressed his sincere thanks to the subscribers for their kindness.

Mr. J. Devonshire, managing director of the London United Tramways Company, was one of the speakers at a presentation of a gold cross and chain to Miss Pearson, of Kingston Hill, from many of the employees of the company and the London County Council Tramways. The ceremony took place on April 19, after a church parade at St. Alban's Church, Surbiton, in connection with the St. Mark's Brotherhood. The Rev. H. M. Cazalet handed over the gift, which was intended as a slight token of the tramway men's appreciation of Miss Pearson's work among them and their families, especially during sickness. Mr. Devonshire said that Miss Pearson's name was known to him by reason of her good works among tramway men, and on behalf of his colleagues and himself he expressed their deep gratitude to that lady, to the vicar, and others for their work in connection with the brotherhood. Mr. Devonshire was accompanied by Mr. A. H. Pott (chief engineer) and Mr. Wright (assistant secretary).

Mr. J. Pollock, chief accountant to Dublin United Tramways Company, died after a short illness on April 17, at the age of 54 years. He entered the company's service 36 years ago, and was held in high esteem by all the officials and employees. For a number of years he was secretary of the Tramway Cycle Club, a flourishing organisation.

Sir Willian Whyte, who two years ago retired from the second vice-presidency and became a director of the Canadian Pacific Railway, died on April 15, at Cornado Beach, California. Sir William was born in Fifeshire in 1843, and was educated in Scotland. He worked in the office of Lord Elgin's estate, and then became station agent on the West of Fife Railway. He went to Canada in 1863, and entered the service of the Grand Trunk Railway.

Mr. A. N. Bannister, a former manager of Norwich Tramways Company, has died at Galleywood, Essex. Mr. Bannister a few years ago was the successful plaintiff in the law suit which established the right of a member of the Church of England married to his deceased's wife's sister to receive the Communion. The funeral took place on April 26 at Eaton, near Norwich, when, in addition to the relatives present, Mr. F. W. Ketley (manager and engineer) and Mr. P. Robertson (chief clerk of the tramways company) attended. Among the floral tributes were wreaths from the directors of the company and the manager and employees. The coffin was conveyed to Norwich in a motor hearse.

CONTRACTS AND ORDERS.

United Electric Car Company have obtained an order for 10 top covers for tramcars from Bolton Council.

Cammell, Laird, and Company have received a contract for the supply of car wheel tires to Gloucester Tramways.

Portsmouth Council have placed a contract for the supply of cable with the British Insulated and Helsby Cables, Limited.

General Electric Company have received an order from Manchester Council for Angold magazine lamps for street lighting.

Thomas Tilling, Limited, have been awarded the contract for the conveyance of mails by motor vehicles between Leeds and Sheffield.

Stewarts and Lloyds, of Glasgow, have obtained a contract to supply steel standards to the Prahran and Malvern Tramway Trust, at £6,680.

Siemens Brothers Dynamo Works have received the annual contract to supply Wotan, Tantalum, and carbon lamps to Salford tramways.

British Westinghouse Company have received a contract for the supply of a 3,000-KW. turbo-generator, with exciter, to Wallasey Council, at £5,489.

Merryweathers have obtained the contract for supplying a first-aid 60-H.P. motor carriage and fire extinguishing appliances and pumps to Great Yarmouth Council.

Sunderland Council have accepted the tenders of the British Insulated and Helsby Cables, Limited, and the Union Cable Company, Limited, for a supply of cable.

Crompton and Company, Limited, have received a contract from Luton Tramways and Electricity Committee for the supply and fixing of a balancer at the generating station.

Plymouth Council have accepted the tender of the Glasgow Numerical Ticket and Check Book Printing Company for the supply of tramcar tickets from April 1, 1914, to March 31, 1917.

Blackburn Council have placed with Walter Scott, Limited, a contract for the supply of tramway rails, and with the Electric Construction Company, Limited, for a three-wire booster.

Wolverhampton Council have placed the following contracts: Three motor equipments, Dick, Kerr and Company, Limited; extensions to the power-station, Messrs. T. and S. Ham.

John Baker and Company were the successful tenderers for supplying steel tires for tramcars to Walthamstow Council for a period of one year, at £15 10s. per ton, less 2½ per cent.

Rotherham Council have awarded the appended contracts: Turbo-alternator, the British Westinghouse Electric and Manufacturing Company, Limited, £7,925; rotary converter, British Thomson-Houston Company, Limited, £2,755.

J. W. Courtenay, Limited, have recently secured renewals of their contracts for the advertising rights on the Keighley Corporation tramways, motor 'buses, trackless trolley cars, and on the Aberdeen Suburban Tramways.

Belfast Tramways Committee have reaffirmed their resolution (referred back by the Council for reconsideration) accepting the tender of Dick, Kerr and Company for renewal and reconstruction of tramway track during the next 12 months.

Burton-on-Trent Council have placed contracts as follow: Turbine, British Westinghouse Electric and Manufacturing Company, Limited, £4,793; switchboards, British Westinghouse Company, £370; pipework, Aiton and Company, Limited, £203.

The War Office have placed contracts for the supply of motor lorries with Clayton and Company (Huddersfield), Limited, Leyland Motors, Limited, J. I. Thornycroft and Company, Limited, Walker Brothers (Wigan), Limited, and the Pagefield Ironworks.

Gravesend Council have allotted contracts as subjoined: British Thomson-Houston Company, Limited, generating plant, £3,772; Mirrlees, Watson Company, Limited, condensing plant, £835; Bruce Peebles and Company, Limited, converting machinery, £2,850.

Melbourne Railway Electrification. — Messrs. Merz and McLellan have accepted the tender of the British Insulated and Helsby Cables, Limited, at approximately £300,000, for overhead equipment required in the electrification of Melbourne suburban railways.

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Mr. John Taylor, of 7, Strand Street, Liverpool, has received an order from Manchester Corporation for 400 Taylor's patent tubular sand controllers. This order is the second year's contract. Newport (Monmouth) Corporation have also ordered 100 Taylor's controllers.

Siemens Brothers Dynamo Works have received contracts for the annual supplies of Tantalum traction lamps to Manchester Corporation Tramways and to Bolton Council, and for traction lamps to Belfast Corporation Tramways and to Newport Council Tramways.

The Edison and Swan United Electric Light Company, Limited, have secured part of the contract for the supply for 12 months of Royal Ediswan lamps to the British Admiralty. Royal Ediswan lamps are being installed throughout the new Cunard liner s.s. "Aquitania."

Glasgow Council have awarded contracts as appended: Special trackwork, Lorain Steel Company and Titan Trackwork Company, Limited; torch lamps, J. T. Donald and Company; steelwork for new turbine foundation at Pinkston power-station, Redpath, Brown, and Company, Limited.

The Albion Motor Car Company, Limited, of Scotstoun, Glasgow, have recently received through their concessionnaires for New Zealand, Messrs. Grapes and Riley, an order for a 15-H.P., 20-cwt. "Albion" car for the tramways and electric lighting department of the Wellington City Council.

Bruce Peebles and Company, Limited, have received contracts to supply a spare armature to West Bromwich Electricity Works, at £1,000; two 350-KW. motor-converters to Armstrong, Whitworth, and Company, Montreal; and one 250-KW. motor-converter to the Canada Cement Company, Montreal.

London and North Western Railway Company have awarded a contract for the supply of eight natural draught cooling towers for their power-station at Stonebridge Park to Balcke and Company, Limited. The plant, which is in connection with the electrification of the suburban lines, will have a capacity of two million gallons of water per hour.

Ilford Council have placed the following contracts for annual supplies to the tramways department: Trolley wheels, Anti-Attrition Metal Company, Limited; tyres, Brown, Bayley's Steel Works, Limited; gear wheels, trolley heads, etc., Alfred Wiseman, Limited; varnish, Robert Kearsley and Company, Limited; elastic journal packing, Hall and Company; tapes, British Thomson-Houston Company, Limited, General Electric Company, Limited, and R. W. Blackwell and Company, Limited; armature coils, P. R. Jackson and Company, Limited; pinions, British Hele-Shaw Patent Clutch Company.

Walthamstow Council have adopted tenders for annual supplies to the tramways and electricity department as follow: British Westinghouse Company, J. W. Rowlands and Company, W. Wood and Company, Anti-Attrition Metal Company, Limited, L. Andrew and Company, Equipment and Engineering Company, Limited, and Imeson and Finch, car accessories; Electrical and Manufacturing Supplies, Cryselco Company, Limited, and the General Electric Company, lamps; C. C. Wakefield, Stern Sonneborn Oil Company, A. B. Gross and Company, and Vacuum Oil Company, lubricating oil and grease.

Belfast Council have allotted contracts for the annual supplies to the tramways and electricity department as subjoined:

Trolley heads, Till and Whitehead, Limited; insulating material, Spicer Brothers; tramcar fittings, screws, nails, and hinges, Till and Whitehead, Limited; iron castings, J. and J. McKeown; malleable iron castings, Hopyard Foundries Company, Limited; springs, W. Griffith and Sons, Limited; electrical accessories, General Electric Company; lamps, Siemens Brothers, Limited; carbon filament lamps, Edison and Swan; metal filament lamps, General Electric Company; overhead line materials, A. Wiseman, Limited; vulcanised bitumen cables, Callender's Cable and Construction Company, Limited; bitumen, W. H. Keys, Limited; street box frames and crown, Gregg, Sons, and Phenix, Limited; cast-iron pipes, Stanton Ironworks, Limited; wrought-iron pipes, Wellington Tube Works; feeder pillars, copper cable connections, etc., W. Lucy and Company, Limited; arc lamp carbons, Sloan Electrical Company, Limited; stoneware, troughing, Doulton and Company, Limited; conduits, T. Wragg and Sons; electric meters, Chamberlain and Hookham; time switches, Venner Time Switches, Limited; maximum demand indicators, Reason Manufacturing Company, and British Insulated and Helsby Cables, Limited.

Salford Council have placed contracts for biennial supplies to the tramways department with the following among other contractors:

Car accessories (electrical), British Westinghouse Company (approximate value £1,080), General Electric Company, C. Mackintosh and Company, Micanite and Insulators Company, Manchester Armature Repair Company, W. Boydell and Sons, and Tramway Supplies, Limited; car accessories (mechanical), Brown, Bayley's Steel Works, Brecknell, Munro, and Rogers, National Rail and Tramway Appliances Company (£1,132), Tramways Supplies, Limited, Watlington and Company, John Baker and Company (£1,625), and British Hele Shaw Patent Clutch Company (£943); special car accessories, British Westinghouse Manufacturing Company and Dick, Kerr and Company; special paints and varnishes, Nobles and Hoare, Limited, and Docker Brothers; ears, frogs, pull-offs, A. Wiseman, Limited, Brecknell, Munro, and Rogers, Watlington and Company, B.I. and Helsby Cables Company, and British Westinghouse Company; special overhead equipment, B.I. and Helsby Cables Company. Annual supplies: Insulating materials, Siemens Brothers Dynamo Works (£684); petroleum, British Petroleum Company (£106); petroleum and petrol, Anglo-American Oil Company, Limited (£684).

Manchester Tramways Committee have accepted the following contracts for supplies during the ensuing year:

Motor and controller spare parts, etc., British Thomson-Houston Company, Limited; motor and controller spare parts, etc., controllers (complete), Dick, Kerr and Company, Limited; motor and controller spare parts, traction lightning arresters, 32 car sets magnetic brake equipment, etc., British Westinghouse Company, Limited; resistances (grid type), Electro-Mechanical Brake Company, Limited; grids for resistances, Henry Wallwork and Company, Limited; controller fingers, etc., canopy trolley bases, Estler Brothers; trolley poles, Brecknell, Munro, and Rogers, Limited; incandescent lamps, switches, bells, telephones, etc., General Electric Company, Limited; incandescent lamps (traction), Drake and Gorham, Limited; cells, rubber strip, mackintoshes for drivers, etc., C. Mackintosh and Company, Limited; impregnating insulation varnish, Pinchin, Johnson, and Company, Limited; insulating compound, R. W. Blackwell and Company; overhead equipment insulating material, pole switches, A. Wiseman, Limited; trolley heads, Equipment and Engineering Company; trolley wheel bushes and spindles, Fleming, Birkby, and Goodall, Limited; electrical signal spare parts, Tramway Supplies, Limited; automatic sanding devices, M. Cummins; tubular sanding devices, J. Taylor; Peacock brakes, Peacock Brake Company; automatic life-guards, Hudson and Bowring, Limited; folding side-guards, Philipson and Company; steel wire, F. Smith and Company, Limited; special blocks and wheels for grinding steel rails, emery wheels, Carborundum Company, Limited; ball races for trolley standards, W. J. Ritchie and Company, Limited; truck and other springs, West Bromwich Spring Company, Limited; anti-friction white metal, Tandem Smelting Company, Limited: car axles and car wheel tires, Cammell, Laird and Company, Limited; car wheel centres, Edgar Allen and Company, Limited; gear and pinion wheels, F. W. Rowlands and Company, Limited; chilled-iron brake block castings, National Rail and Tramway Appliances Company, Limited, and Interchangeable Brake Block Company, Limited; tramcar meters, Chamberlain and Hookham, Limited; Thermit welding, etc., Thermit, Limited, London.

Other contracts accepted are for tramway rail bonds, British Insulated and Helsby Cables, Limited; trolley wire, F. Smith and Company, Limited; and brackets and tubes for tramway poles, J. Spencer, Limited.

London County Council Contracts.—London County Council have accepted the following contracts: Thermit, Limited, 1,500 welding portions for rail joints at 19s. 6d. each, 7½ additional portions to be supplied free of cost for every 100 ordered: John Mowlem and Company, road-work and plate-laying for the construction of the remainder of various tramways in High Street, Wandsworth, and from London Road to Forest Hill, and paving works in connection with the widening of High Street, Wandsworth. For the supply of tramway parts, equipment, etc., for the twelve months ending April 30, 1915, the following tenders have been accepted:

Electrical equipment (motor and generator) spares: The British Westinghouse Company; Dick, Kerr and Company; Dyer and Young, £145 10s.; Alfred Clare and Company, £134; the Manchester Armature Repair Company, £215 12s. 6d.

Electrical equipment (controller, circuit breaker and other switch, etc., details, and magnetic brake) spares: British Westinghouse Company; Dick, Kerr and Company, £30 6s.

Contact fingers and parts, segments, etc.: Edwin Showell and Sons, £771; Tramway Supplies, Limited, £313 12s. 7d.; Dyer and Young, £168; British Westinghouse Company, £5 18s. 6d.

Pressed brass and steel articles: Mole and Son, £470; Hadfield's Limited, Sheffield, £73 8s. 9d.; the Conveyor and Elevator Company, £89 2s.; J. Sankey and Sons, £50 18s. 9d.; W. M. Still and Sons, £125 6s. 10d.; Peter Hooker, £72 10s.

Electric cable, fuse wire, and cotton-covered copper wire: London Electric Wire Company and Smiths, Limited, £1,474 13s. 4d.; Liverpool Electric Cable Company, £418; Callender's Cable and Construction Company, £550 15s; Hooper's Telegraph and India Rubber Works, Limited, £396; Saxonia Electrical Wire Company, £106 17s. 6d.; British Insulated and Helsby Cables, £1,048 16s. 8d.

Coach painters' transfers: Corner and Company, £20 10s.; Dangerfield Printing Company, £19; Tearne and Sons, £7 6s. 6d.

Rubber details: India Rubber, Gutta Percha, and Telegraph Works Company, £24 7s. 6d.; J. G. Ingram and Son, £1,221 15s. 2d.; Irwell and Eastern Rubber Company, 18s.; North British Rubber Company, £76 19s. 3d.

Moulded insulators (other than rubber): British Westinghouse Company, £113 6s., Ebonestos Manufacturing Company; Turners and Manville, E.C., £12 12s.; Litholite Limited, £92 4s.; Crystalate Manufacturing Company, £2 14s.

Fibre articles: J. Burns, Limited, £8 6s. 9d.; Cort and Company, £12 18s. 6d.; F. A. Hill and Company, £21 16s. 6d.

Mica and micanite articles: G. Schultz and Company, £4 6s.; Micanite and Insulators Company, £17 18s. 6d.

Car furniture: J. M. Siddell, £80 10s. 6d.; Howarth and Housen, £31 10s. 2d.; Edwin Showell and Sons, £71 19s. 9d.; Brush Electrical Engineering Company, £24 12s.; Gabriel and Company, £11 5s.

Machined bronze bearings: Anti-Attrition Metal Company, £3,791 5s. (allowance for worn-out bearings, 10d. a lb.).

Gear and pinion wheels, ratchets, worms, etc.: British Hele-Shaw Patent Clutch Company, £200 15s.; F. W. Rowlands and Company, £949; John Holroyd and Company, £32 8s.; Player and Mitchell, £21 12s.

Iron and steel drop-forged stampings: Charles Bunn, Limited, £305 7s.; Vaughan Brothers, £76 18s.; Criterion Stampings, Limited, £80; Deritend Stamping Company, £123; Armstrong, Stevens, and Son, £232 12s. 8d.; Woodall and Company, £16 10s.

Iron and steel forgings: Male and Jordan, £44 14s.; Brush Electrical Engineering Company, £36 12s.; Hurst, Nelson, and Company, £22 1s. 9d.; Woodall and Company, Hull, £76 14s. 6d.; Bayliss, Jones, and Bayliss, £173 17s.; Charles Bunn, Limited, £259 4s.; East Ferry Road Engineering Works Company, £28 4s.; Warren and Sons, £14 8s.

Springs: Lion Spring Company, Oldbury, £5 17s.; West Bromwich Spring Company, £405 19s. 6d.; Joseph Steel and Sons, £11 2s.; George Salter and Company, £28 4s. 8d.; Tempered Spring Company, Sheffield, £30.

Machined iron castings: John Holroyd and Company, £112 10s.; H. Newton Knights and Company, £247 10s.; John Crowley and Company, £70 2s. 1d.; T. Summerson and Sons, £382 10s.; the Carron Company, £622 10s.

Machined malleable iron castings: Bullers, Limited, £668 14s. 11d.; Leys Malleable Castings Company, £270; John Crowley and Company, £6 18s.; Brecknell, Munro, and Rogers, £36.

Malleable iron castings: John Crowley and Company; Shotton Brothers, Smethwick.

Steel castings: Edgar Allen and Company, £371 5s. 9d.; S. Peace and Sons; M. and G. Truck and Engineering Company, £122 17s.; Hurst, Nelson, and Company, £18; F. W. Rowlands and Company, £162 15s.; Hadfield's, Limited, £601 14s.; H. R. Marsden, Limited, £35 16s. 1d.; T. Firth and Sons, £22 1s.

Foundry crucibles, etc.: Morgan Crucible Company, £286 7s. 10d.

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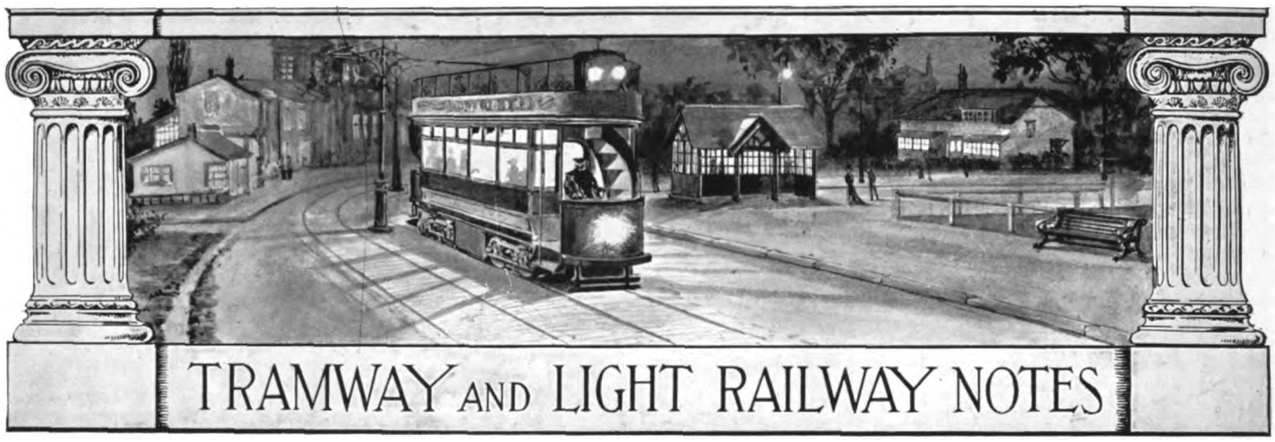

BIRMINGHAM.

EX-SERVICE MEN AS CAR EMPLOYEES—ALL-NIGHT CAR CENSUS.

Mr. Alfred Baker, the general manager of the Corporation Tramways, has given evidence before a committee which has been sitting in connection with the War Office to inquire into the question of securing a wider range of employment for retired soldiers. Mr. Baker was able to show that the Birmingham Corporation are good friends of capable ex-soldiers. In the employ of the tramway department there are 500 ex-soldiers, or one-third of the total number of the employees. Mr. Baker said that he had always found that the ex-soldier usually made an excellent driver or conductor, inasmuch as he was accustomed to discipline and cleanly in his habits. The Army character as a rule could be relied upon. It is stated that the census of pedestrians recently made along the chief tramway routes during the night did not indicate that an all-night car service was likely to be extensively used. The receipts from the first-class cars on the Hagley Road route having improved lately, the experiment is to be continued.

BRADFORD.

FIFTY CAR BODIES REQUIRED.

The Council have adopted a recommendation for inviting tenders for the supply of 50 car bodies. Replying to a suggestion that the bodies should be made by the department, Mr. Priestley, the chairman of the Tramways Committee, said the routes had been extended and there had been complaints of overcrowding. The manager was asked whether, in addition to doing the ordinary repairs, the workshops would be able to put the necessary new cars on the road in a reasonable period. His reply was: "Certainly not."

CARDIFF.

SICK EMPLOYEES' EXAMINATION—HALFPENNY FARES REJECTED.

The trade unionists among the tramway employees have passed a resolution not to submit to an independent medical examination after their respective panel doctors have certified them as fit to resume duty after illness. A resolution requiring the men to be examined if considered necessary by the tramways manager had been passed by the Tramways Committee. It is contended by the men that as they are not paid wages during sickness, the one certificate should suffice.—By 19 votes to 14 the Council have defeated a proposal in favour of halfpenny stages. The proposer stated that inquiry showed that in towns of about 120,000 population halfpenny fares were not a financial success, but in towns and cities approximating in size to Cardiff, where the halfpenny stage was half a mile, halfpenny fares had been a success. Sir John Courtis, chairman of the Tramways Committee, stated that in 1913 28,365,277 passengers were carried, and of these 24,334,185 (over 86 per cent.) were penny passengers. Penny fares brought in £118,108 out of the total of £128,883. An alteration such as that proposed would result in a loss.

CROYDON.

EXPERIMENT IN CUSHIONED SEATS—THROUGH-RUNNING DIFFICULTY.

With a view to obtaining the opinion of passengers upon the innovation, a Croydon Corporation tramcar is to fitted with cushions to the lower-deck seats. The change is likely to be favourably received, not only because it will give passengers the more comfortable seat to be found in the competing omnibuses, but also because the cushions cause less wear to clothing. In the course of last year the London County Council made a proposal to Croydon Corporation for the institution of through running, but as the carrying out of the scheme would have entailed an outlay of over £40,000 it did not meet with acceptance. The chief items of the expenditure would have been for an additional supply of bogie cars of equal horse-power to those of the London authority, and for track reconstruction. Under the auspices of the Croydon Trades and Labour Representation Council, a meeting was held on April 23 to demand through running, halfpenny fares, the reopening of the Whitehorse Road route, and its extension to Upper Norwood, and further extensions at Addiscombe and Coulsdon. The through running request was not persisted in, but the meeting asked for the institution of return fares. Complaint was made of the expense to the rates entailed by motor omnibus traffic. The Corporation were asked to support the recommendations of the Select Committee on London traffic. Despite the competition put up by omnibuses, the tramway undertaking shows a small net profit as the result of the past year's working. One means of effecting this has been an increase in speed, another is the keen look-out for passengers kept by the car crews A heavy loss is entailed on the tramway in the centre of the business locality by the existence of only a single track. Hitherto an alleged veneration for an old building of no real value has prevented a widening being effected.

GLASGOW.

RECORD FOOTBALL TRAFFIC—CONGESTION PROBLEM IF FARES ARE REDUCED—ALL-NIGHT SERVICE AGREED TO.

The England versus Scotland football match at Hampden Park, Glasgow, created a new record for a Saturday in the tramway receipts. The amount taken was £5,074, as against £4,438 at the international match two years ago. In reporting on suggestions for various concessions, Mr. James Dalrymple, the general manager, points out that a little over two years ago the Corporation inaugurated the long halfpenny ride. It would be unfortunate, he thinks, after steering clear of the rocks and shoals that had wrecked many another municipal tramway, that the committee should, on the completion of 20 years' successful operation, now take a step which they might afterwards wish to retrace. The doubling of the halfpenny stage had been, so far as the increase in the number of passengers carried was concerned, very successful. For 1909-10, the year immediately preceding the last two changes in fares, 222 million passengers were carried. They were now carrying nearly 340 millions. In order to cope with this traffic they had built 50 additional cars, and were about to start on another lot of 150, which would bring the total up to 1,000 The question which was now being asked was: "Where are we to find room for all these cars in the streets?" If they did not get other main arteries through the centre and across the Clyde the congestion would become intolerable. Should the halfpenny fare now be extended to cover three stages, or about 1¾ miles from the centre of the city, it would, to a great extent, wipe out the present penny passenger, who was the mainstay of the system. Of course, were the halfpenny distance extended to cover three stages instead of two, it followed that the penny distance would cover six stages instead of four, and that nine stages would require to be given for 1½d., and twelve for 2d. Should the fares be reduced as indicated he estimated there would be a drop in the gross revenue of £173,500. It would take an additional 42 million 1d. passengers to make up the drop caused by the above all-round reductions. The most serious aspect of the question was the resultant congestion of traffic.—On April 16, the Council adopted a recommendation by the Tramways Committee for the institution of an all-night service of cars next autumn. The report of the general manager stated that the all-night service in London was operated at a considerable loss. On going over some charts of the Manchester service he found that the greatest number of passengers carried at any point, covering quite a considerable period, was 32. On many of the inward journeys, especially those about 3 and 4 a.m., there was only one passenger on the car all the way. He was inclined to think that the average revenue in Glasgow would not exceed 3d. per car-mile, or £2,075 per annum, which would mean a loss of over £3,300.

LEICESTER.

PAYMENT-ON-ENTRY CARS.

After a year's trial of the system of fare collection of the International P-A-Y-E Tramcar Company on the Narborough Road route, the Corporation on April 28 decided to discontinue it by a majority of two, against the practically unanimous advice of the Tramways

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Committee. The decision, absurdly enough, appears to have been made on purely political grounds. The chairman and tramway officers and men are strongly in favour of the system.

LIVERPOOL.

CAR IMPROVEMENTS—NEED FOR INCREASED SPEED—THE SUGGESTED UNDERGROUND RAILWAY—DEPUTATION FROM GLASGOW.

Several cars embodying an improvement in the double-staircase type of body, devised by Mr. C. W. Mallins, the general manager, are being placed in service. While retaining the double staircases, the vestibules have been made more commodious, and very wide aisles have been provided on both decks, while there is ample space between the transverse seats. The wheel base has been increased to 8 ft., and in some instances to 9 ft. This has enabled provision to be made for 80 passengers, or 10 above the accommodation of ordinary cars. The improved body is carried on a single truck, which is said to be free from oscillation, and to be very safe in passing points. Application has been made to the Board of Trade to grant an increase in the speed of the cars. The Liverpool Engineering Society on April 15 discussed the various schemes for dealing with the Mersey traffic problem, including the proposal made by Mr. C. W. Mallins, the tramways manager, to develop a system of underground railways radiating from the Old Haymarket to Queen's Drive, and connecting with a tunnel under the river to Seacombe, with a branch to Birkenhead.

LONDON.

FURTHER TRAIL CAR PROVISION—INCREASED SPEED—THE WORST DEAD END.

It was announced on April 23 that the Board of Trade had sanctioned the application made for authority to run a larger number of trail cars on the Council's southern tramways. Now that Parliament have agreed to the use of trail cars on the London United Tramways, the two undertakings may hope to carry out their intention of running through motor and trail cars from the Embankment to Hampton Court. Before arriving at their decision on the County Council's application, the Board of Trade ascertained the views of the Borough Councils. Although trail cars have been running for a considerable period on several routes without complaint, the Greenwich Borough Council recorded a protest against the introduction of them in their district. Another matter upon which the Board of Trade have invited the views of the Municipal Councils is the question of increasing the present 12-mile speed limit to 16 miles in numerous localities. They informed Greenwich Council that they propose to grant the increase in their area except between Deptford Bridge and Royal Hill, and in South Street and Lewisham Road. The Council replied that they had no observations to offer, "as it would appear that the 12-mile limit is at the present time exceeded in a very large number of cases." Present and future tramway bills promoted by the County Council are to have as their main object the joining up of termini in the central and other areas. One such scheme came before a Committee of the House of Commons on April 22, when Mr. Fell, chief officer; Mr. Humphries, chief engineer; and Mr. Hume, chairman of the Highways Committee, supported the proposal to extend the Aldgate lines by a single line round Trinity Square. By this means there would be an abolition of what the police describe as the most troublesome terminus. The proposal was objected to by the Port of London and the Trinity House authorities, who have offices in the Square. The committee sanctioned the scheme.

MANCHESTER.

RECORD EASTER TRAFFIC—SHORTER ROUTE TO SALFORD—BOARD OF TRADE REPORT ON AN ACCIDENT—CARS AND RAILS REQUIRED.

Passengers to the number of 307,614 more than for the corresponding days of Easter, 1913, were carried on the tramways during the Easter holidays. The receipts increased by £1,051, although there had been a considerable increase in the distances included in the various stages. For the four days the total receipts were £11,944, as against £10,893 in 1913, while the number of passengers was 2,516,714 and 2,209,100 respectively. The highest Easter receipts were in 1907, when £11,990 was taken from only 2,076,633 passengers. On April 11 a more direct route between Pendleton and Pendlebury and Heaton Park was opened *via* Frederick Road, Broughton Lane. It avoids touching the township of Salford or the centre of Manchester, as was the case with the old route. While the fare on the latter was 3½d., the charge on the new route is only 1½d. Colonel P G. von Donop, R.E., of the Board of Trade, has presented a report on his inquiry into the circumstances of a car running off the curve at High Street and Upper Brook Street and overturning. There was a fog at the time, but the driver admitted that he could see 40 yards ahead, and that he was going too fast, his excuse being that he did not know how near he was to the curve. The rules are that in foggy weather cars must be driven slowly, a sharp look-out kept, and that the car must be driven slowly through all facing points and round all curves, and when entering and leaving loops the speed must not exceed four miles an hour. The report states that there could be no doubt the driver allowed the car to run at top speed along High Street.—At a meeting of the Tramways Committee on April 21, it was reported that during the current year the estimated outlay on capital account will be £160,000. The estimate includes £51,000 for cars and car equipment, £25,000 for street improvements, £30,000 for new lines, and £52,000 for buildings. Out of the past year's profits

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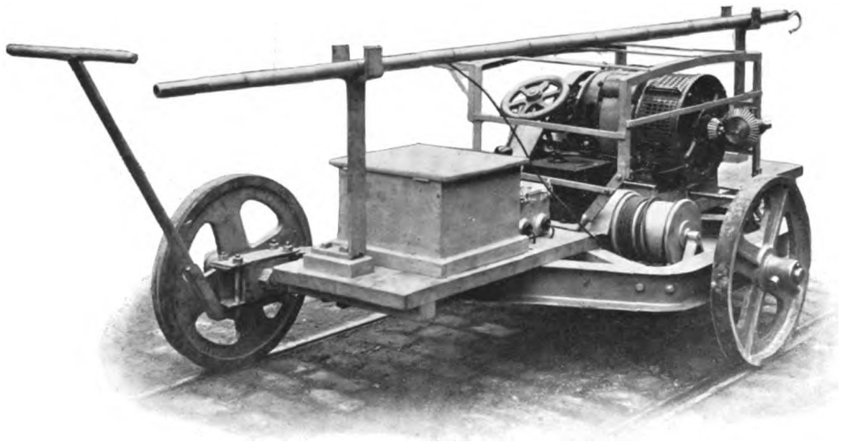

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it is proposed to give £100,000 in relief of rates. Last year the Corporation appropriated £103,000 for that purpose.

READING.

INCREASED SPEED BRINGS HIGHER RECEIPTS.

The Mayor (Alderman Field), at the April meeting of the Corporation, said that previous to the past year the highest receipts of the tramways were £32,543, in 1911; this year the total would exceed £36,909. The increase had been very largely due to the acceleration in the speed of the cars, which had come to be very much appreciated by the public. They ran 26,000 extra car-miles. The receipts per car-mile formed a record, being 9·2 of a penny against 8·64 last year. The nearest approach to that figure was 9·08 in the first year.

SHEFFIELD.

SITE FOR A NEW DEPOT—THE CHIEF CONSTABLE AND TRAFFIC CONTROL.

The Tramways Committee have acquired land in the Crofts area for the purpose of erecting a depot. In his annual report the Chief Constable alleges that confusion arises from the division of the control of the streets among several committees, and he suggests that a Traffic Control Board should be formed, to consist of representatives of the Watch, Tramways, Highways, Markets and Improvement Committees. The report makes the following references to the tramways: "In many parts of the city the lines are laid too near the side of the road or along narrow streets or so as to dominate nearly all the available space; queues of intending passengers are allowed to obstruct the road; passengers at some of the city termini are compelled to descend into the middle of the road traffic at considerable danger to themselves; in some cases cars stop abreast instead of in echelon, with several cars on each line, one behind the other, and stop too near a street corner so as to obstruct the traffic."

SOUTHPORT.

INTRODUCTION OF OPEN CARS.

Following an example which has proved so conspicuous a success on the Blackpool tramways, the Southport tramways management a few weeks ago introduced an open single-deck car. This is utilised for making a tour of the tramways, and it has met with such gratifying patronage that the Tramways Committee have ordered three additional cars of this type.

SOUTH SHIELDS.

AN EXTENSION OF THE SYSTEM—RESULT OF INCREASED FACILITIES.

The Corporation have decided to extend the tramways within the borough boundary, at a cost of £8,000. After making preliminary inquiries in regard to the acquiring of powers to extend the service to Sunderland, a sub-committee have recommended the extension of the tramways in two directions. A profit of £4,000 over the previous year is reported as the result of the past year's trading. Statistics of the past year's working show that 12,000 return tickets were sold weekly when the price of return tickets was reduced from three halfpence to a penny, while the reduction of the charge for four-journey tickets from 3d. to 2d. increased the sale of these from 280 to 1,600 per week During the year the number of passengers increased by 1½ millions, the receipts by £4,000, and the car-mileage by 83,000.

WALLASEY.

PROPOSED CIRCULAR ROUTE AND OPEN CARS.

The Corporation are considering a scheme to extend the New Brighton promenade, and to construct tramways from New Brighton Pier to Wallasey Village. This would give a circular route, and it is proposed in summer to run open cars along the great length of sea front. Powers are to be obtained to run omnibuses to Leasowe and other places, which are popular during the summer.

Hurst, Nelson, and Company, Limited.—Much exaggerated reports have been circulated as to the extent of the destruction caused by the fire which took place at this company's works at Motherwell, on April 27. The fire was fortunately confined almost entirely to the carriage building shops, and temporary arrangements are being made so that the car and carriage work will be carried on until the buildings destroyed by the fire are rebuilt.

South Western Suburban Railway Electrification.—It is hoped that in the early part of July trial trips may be run on the circular route from Waterloo *via* Wimbledon, Kingston, Twickenham, Richmond, Putney, and Clapham Junction, and back to Waterloo. Although the manufacture of the equipment for the station at Wimbledon is well advanced at the Preston Works of Dick, Kerr and Company, Limited, the station buildings will not be completed by that time, and current will be obtained from the District Railway's station at Chelsea. Good progress is being made with the electrification of the other suburban routes. At a place between Vauxhall and Waterloo a flying junction will be constructed to carry the electric tracks over the steam lines.

PATENT LIST.

Specially abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

***** If the inventions have been communicated the names of the communicators are given below in italics.**

APPLICATIONS.

The following Applications for Letters Patent have been filed:

7,949 Spring controlling devices for tramway points and switches—D. Carnegie and S. C. Gladwin.
7,961 Route indicators—J. O. Fulton.
7,986 Life-guards—J. G. Moore,
8,064 Train control systems—P. A. Arnott.
8,069 Rail joints—M. J. Wightman.
8,116 Wheel and life-guard—F. T. Wood.
8,131 Electric accumulators—Tudor Accumulator Company, Limited *(Lorenz Lucas)*.
8,144 Drainage plant for road beds containing tramway tracks—Deutsche Asphalt-Akt.-Ges. der Limmer und Vorwohler Grunenfelder.
8,187 Joints between rails—C. W. Von Roemer and F. C. Lynde.
8,226 Life-guards—W. Philipson, T. W. H. Philipson, and P. C. Philipson.
8,277 Apparatus for operating railway switch points—F. H. Smethurst.
8,295 Sanding apparatus—G. Webster and E. Sidgwick.
8,300 Gauges for the permanent way—J. J. S. Barnhill.
8,327 Control apparatus for multiple-speed gear—B. A. Payne and Bristol Tramways and Carriage Company, Limited.
8,336 Speed indicator and controlling device—J. P. Howarth.
8,344 Means for the regulation of railway traffic—H. Von Kramer.
8,369 and 8,370 Electrical control of signals—Compagnie de Signaux Electriques pour Chemins de Fer.
8,381 Front-wheel guards and life-saving devices—L. E. Sadler.
8,398 Railless electrical vehicles—W. H. Turner and W. H. Isherwood.
8,432 Tramcars—G. Ashton.
8,514 Method of reinforcing concrete sleepers—L. Green.
8,572 Reversible car seats—M. E. Curwen *(J. G. Brill Company)*.

GREEN'S ECONOMISER

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8,595 Electric welding machines—Allgemeine Elektricitäts. Ges.
8,698 Rail supports for sleepers—L. Green.
8,781 Metallic railroad ties—F. F. Green.
8,882 Air brakes—C. W. Bryant and P. Brotherhood, Limited.
8,938 Brake mechanism—J. S. Y. Fralich.
8,977 Route indicators for tramway cars—H. B. Crudington.
9,011 Vacuum brake apparatus—E. S. Luard.
9,108 Life guards for motor omnibuses—J. F. Nicholls.
9,134 Electrically-controlled block systems—J. Sayers, W. C. Acfield, G. Salt, and B. W. Cooke.
9,267 Step for cars and omnibuses—J. R. Kunzelman.
9,274 Rails for tramways and railways—C. Burkill.
9,300 Automatic electrical signalling between trains—A. Brown.
9,412 Railway and tramway anti-friction axle boxes—R. F. Hall.
9,422 Automatic signalling device for locomotive engines—F. Murphy and H. Whitehead.
9,436 Car trucks—W. S. Adams.
9,476 Brakes for railway vehicles—L. M. Masson.
9,537 Car trucks—W. S. Adams.
9,538 Joints for electric cables—C. G. Watson and Callender's Cable and Construction Company, Limited.
9,539 Joints on insulated electric conductors—C. G. Watson and Callender's Cable and Construction Company, Limited.
9,555 Vacuum brake apparatus—A. Richardson.
9,556 Reversible life-guard to work automatically—W. Bates
9,563 Permanent way of railways—R. H. Newsome.
9,582 Electric railway systems—K. E. Stuart.
9,611 Track circuits for railways—W. H. Dammond.
9,673 Chair to avoid all dipping in rail joints—C. Jones
9,681 Railway chairs—G. McCurdy.
9,690 Life-guards for motor omnibuses—H. C. Bentley.

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9,730 Car trucks—W. S. Adams.
9,731
9,732 Car trucks—A. F. H. Head.
9,733 Car trucks—J. A. Brooks.
9,776 Process of welding and appliances therefor—F. Werner.
9,810 Railway safety signals—C. O. Brown.
9,825 Shield for motor omnibus wheels with life-saving guard and mud-guard combined—G. W. Richardson.
9,835 Permanent ways for tramways—H. Schmidt.
9,894 Apparatus for preventing accident with motor omnibuses, etc.—T. Giusti.
9,899 Life-guard for motor omnibuses—F. Howett.
9,908 Automatic life-guard for motor omnibuses, etc.—C. Carpenter and H. Tagg.
9,924 Automatic signals for railways—R. S. Taylor.
9,932 Laying sets with respect to tramway lines or rails, and blocks or sections to be used in such connection—W. Shepherd.
9,970 Retrievers for trolley collectors on electric traction systems—F. A. Wasson.
10,016 Audible signal for tramcars—W. Farrall.
10,159 Rail chair key—James Thomas and John Thomas.
10,273 Automatic car and train pipe couplings—C. H. Tomlinson.

Specifications Published.

1913.

6,005 Double-deck cars—Hedley and Doyle.
6,186 Electric train signalling and controlling systems—Allard.
8,002 Joint for connecting rods operating railway points—Butler.
14,336 Automatic train stop devices—Hudson.
19,101 Rail joints—Surtig, Briar, and Meno.
20,127 Car trucks—Hewitt.
6,485 Securing tramway rails to sleepers—Heydt.
13,410 Railway ties and clamping devices for rails - Rupp.
17,870 Metal railway ties—Anderson.
29,334 Means for joining the adjacent ends of tramway rails—Hughes (*Underwood*).
29,886 Railway car trucks—Armstrong.
7,305 Overhead conductors for electric traction systems—Bowen and Cedes Electric Traction Limited.
9,653 Automatic couplers for tramway and trailer vehicles—Watson and Ingram.
14,039 Bogie truck for railway carriages—Addis
15,178 Means for preventing creep of rails—Phelps.
15,701 Car fenders—MacMahon and Warden.
7,486 Route and speed indicators—Jones.
7,582 Railway signalling aparatus—Forse and Spiller.
7,665 Railway motor cars—Baguley.
9,477 Railway rail chairs—Imray (*National Malleable Castings Co.*).
15,013 Life-saving guard for motor omnibuses—Le Bosse.
15,125 Wheel guards for motor omnibuses—Courtness.
17,936 Car trucks—Hewitt.

1914.

1,614 Rail track slewing machines—Kammerer and Arbenz.
3,837 Tie bars for railways—Loutzenhiser.
1,003 Reversible seats for tramcars—Anger.

TRAFFIC RETURNS.

Colonial and Foreign Tramways.

NAME OF COMPANY.	1913. WEEKS ENDING.					1914. WEEKS ENDING.					AGGREGATE.		
	April 5.	April 12.	April 19.	April 26.		April 4.	April 11.	April 18.	April 25.		Wks.	1914.	Increase or Decrease.
	£	£	£	£		£	£	£	£			£	£
Anglo-Argentine	57,276	59,251	54,424	56,692	...	55,783	60,262	53,529	50,179	...	17	959,878	+ 11,623
Auckland ... ... (28 days)	...	20,216	...	...	...	...	21,702	...	...	...	40½	204,124	+ 4,813
Brazilian Street ... (month) Mlrs.	46,496	...	...	...	...	54,582	...	...	...	...	35	423,040	+ 65,379
Brazilian Traction	94,214	94,350	93,097	91,496	...	93,996	93,729	93,689	90,623	...	17	1,609,869	+ 74,169
Brisbane ... ...(month)	26,370	...	...	...	...	28,325	...	...	...	...	13	81,915	+ 7,875
British Columbia ... (month) $	720,493	...	...	...	...	717,251	...	...	...	...	39	6,752,082	+349,161
Buenos Aires Port and City (month)	...	...	...	...	...	...	...	...	...	...	—	—	—
Buenos Ayres Lacroze ...(month)	46,227	...	...	...	...	45,222	...	...	...	...	39	402,125	+ 7,115
Calcutta ... ... Rs.	63,600	64,036	66,096	63,006	...	68,814	66,024	66,488	65,808	...	17	11,51,756	+ 52,426
Cape Town ... ...(month)	13,197	...	...	...	...	13,992	...	...	...	...	13	41,980	+ 2,693
Carthagena and Herrerias (month)	...	...	...	3,050	...	...	...	...	2,069	...	17	10,189	— 2,933
Cordoba ... ...(month)	12,668	...	...	...	...	13,499	...	...	...	...	52	159,207	+ 13,593
East India ... ...(month)	...	...	...	1,760	...	...	...	...	1,837	...	39	17,239	+ 717
Kalgoorlie ... ...(month)	2,862	...	...	...	...	2,476	...	...	...	...	13	6,985	— 1,255
La Plata ... ...(month)	...	..	...	5,307	...	...	...	...	4,716	...	17	19,956	+ 1,639
Lima ... ...(month)	...	...	...	...	...	...	...	...	...	...	—	—	—
Madras ... ... Rs.	(2 weeks)	26,766	(2 weeks)	27,549	...	(2 weeks)	34,504	(2 weeks)	30,297	...	17	2,33,027	+ 20,307
Melbourne ... ...(month)	...	...	...	...	...	...	...	...	...	...	—	—	—
Mexico ... ... (month) $	606,411	...	...	...	...	617,654	...	...	...	...	13	1,750,819	+253,412
Montevideo ... ...(month)	...	...	...	30,087	...	...	...	...	29,645	...	26	200,176	+ 414
Para	4,337	3,935	4,170	3,936	...	3,651	3,865	3,469	3,323	...	21	72,782	— 14,113
Port Elizabeth ... ...(month)	3,943	...	...	...	...	4,535	...	...	...	...	13	12,875	+ 844
Puebla ... ... (month) $	62,500	...	...	...	...	67,300	...	...	...	...	13	195,400	+ 23,800
Shanghai ... ... $	19,882	21,134	22,061	20,652	...	24,000	24,600	26,800	24,400	...	16	384,600	+ 63,235
Singapore ... ... $	11,675	11,804	11,432	11,223	...	11,679	12,195	11,559	11,227	...	17	203,500	+ 9,615
Toronto ... ... (month) $	772,491	...	...	...	...	836,328	...	...	...	...	13	2,461,956	+194,224
Winnipeg ... ... (month) $	329,016	...	...	...	...	347,812	...	...	...	...	13	1,081,461	+ 80,516

(Continued on page 386).

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TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1913. WEEKS ENDING. April 5.	April 12.	April 19.	April 26.	1914. WEEKS ENDING. April 4.	April 11.	April 18.	April 25.	AGGREGATE. Wks.	1914.	Increase or Decrease.
	£	£	£	£	£	£	£	£		£	£
Aberdeen Corporation ...	1,442	1.454	1.389	1.411	1.458	1.517	1.662	1.704	47	74.839	+ 4,537
Accrington Corporation ...	378	653	531	546	481	649	758	581	3	1.989	+ 258
Ayr Corporation ...	218	240	225	257	253	278	375	328	49	17.493	+ 2.568
Bath Electric ...	1.078	750	748	758	781	840	1.393	1.012	16	12.512	+ 855
Birkenhead Corporation ...	1.177	1.162	1.169	1.187	1.289	1.261	1.374	1.247	3½	4.791	+ 288
Birmingham Corporation ...	11.263	11.109	11.584	11.754	12.524	12.372	14.319	12.260	4	46.709	+ 3.700
Blackburn Corporation ...	1.157	1.172	1.166	1.240	1.168	1.219	2.154	1.411	4	5.954	+ 1.218
Blackpool Corporation ...	667	554	548	623	244	743	3.478	955	3½	5.421	+ 3.050
Bolton Corporation ...	2.550	2.662	2.627	2.658	2.652	3.536	3.012	2.936	4	11.422	+ 1.301
Bournemouth Corporation ...	1.767	1.759	1.986	1.899	1.778	3.058	2.187	2.044	4	9.363	+ 1.662
Bradford Corporation ...	4.130	5.534	5.458	5.712	3.790	6.231	8.094	6.404	4	24.519	+ 3.685
Brighton Corporation ...	723	819	878	921	652	1.194	1.363	1.042	3½	4.252	+ 911
Bristol	7.131	7.017	6.915	7.314	8.170	8.270	11.497	8.447	16½	126.727	+ 11,740
British Electrical Federation ...	40.893	41.072	41.377	45.501	53.638	55.975	69.913	56.827	—	—	—
Burnley Corporation ...	1.586	1.635	1.568	1.670	1.625	2.071	1.835	1.588	4	7.119	+ 660
Burton-on-Trent Corporation ...	264	274	271	279	284	241	326	298	4	1.149	+ 96
Bury Corporation	1.263	1.270	1.307	1.291	1.303	1.735	1.524	1.408	3½	5.649	+ 685
Cardiff Corporation ...	1.920	2.497	2.555	...	1.804	2.761	3.295	...	2	7.860	+ 907
Chatham and District ...	860	788	799	888	916	957	1.343	933	16	13.909	+ 391
Chesterfield Corporation ...	...	316	241	...	...	330	341	...	2	671	+ 114
Colne Corporation... ...	238	...	...	270	249	...	...	284	—	—	—
Cork Electric	470	496	476	469	484	491	523	542	16	7.426	+ 113
Croydon Corporation ...	1.502	1.468	1.467	...	1.666	1.780	2.336	...	2	4.820	+ 1.049
Darlington Corporation ...	219	215	230	246	257	258	296	248	4	1.059	+ 148
Derby Corporation ...	11 days)	1.527	941	947	(11 days)	1.716	1.223	972	3½	3.912	+ 497
Dover Corporation ...	164	196	201	216	137	253	302	235	4	927	+ 148
Dublin and Lucan ...	138	134	132	131	130	127	185	152	16	1.981	- 46
Dublin United	5.905	5 595	6.122	5.822	5.793	5.371	6.248	6.088	16½	87.707	- 2.672
Dundee City	1.236	1.289	1.038	1.271	1.252	1.263	1.386	1.353	49	63.767	+ 4,191
East Ham Corporation ...	1.066	1.099	1.076	1.028	1.011	1.077	1.197	1.030	3½	3.909	+ 120
Exeter Corporation ...	134	301	297	311	154	330	479	362	4	1.325	+ 282
Gearless Motor 'Buses ...	...	106	115	176	494	470	525	514	17	7.639	+ 7,243
Glasgow Corporation ...	20.004	20.155	20.191	21.525	21.948	21.191	21.572	22.345	47	966.620	+ 66.311
Glossop (Urban Elec. Supply Co.)..	117	123	122	130	115	135	139	129	17	2.070	- 10
Halifax Corporation ...	...	1.802	1.898	1.883	...	1.983	3.039	2.282	3	7.305	+ 1.483
Hastings and District ...	888	837	804	887	776	799	1.618	1.114	16	12.804	+ 204
Huddersfield Corporation ...	1.957	1.905	2.046	2.084	2.146	2.243	3.243	2.240	4	9.115	+ 1.548
Hull Corporation	3.009	3.031	3.020	3.025	3.172	3.309	3.453	3.123	4	11.872	+ 462
Ilford U.D. Council ...	431	433	444	450	484	529	617	488	3	1.936	+ 380
Ilkeston Corporation ...	115	121	126	131	128	166	124	131	5	672	+ 74
Ipswich Corporation ...	219	372	378	413	251	468	551	424	4	1.696	+ 327
Isle of Thanet	348	330	398	450	375	577	873	512	30	10.981	+ 1.068
Kilmarnock Corporation ...	162	161	160	169	162	174	181	170	49	8.562	+ 518
Lanarkshire	1.658	1.654	1,575	1,806	1,882	1,852	2.030	2.259	16	30.114	+ 4,122
Lancashire United ...	1.323	1.360	1.435	1.434	1.530	1.515	2.387	1.700	16	25.574	+ 3.398
Leeds City	7,557	7.511	7.869	8.159	8.163	8.386	10.179	8.322	4	32.115	+ 4.636
Leicester Corporation ...	2.595	2.595	2.716	2.763	2.821	3.094	3.509	2.917	17	47.073	+ 3.083
Leith Corporation... ...	666	652	623	685	692	696	718	788	49	34.713	+ 1.769
Leyton U. D. Council ...	1.157	...	...	...	1.268	...	...	...	52	68.233	+ 248
Liverpool Corporation ...	12.931	12.263	12.288	12.449	13.110	13.054	13.951	13.169	16½	211.894	+ 12.059
Llandudno and Colwyn Bay ...	200	194	208	215	180	239	534	264	21	38.081	+ 91
London County Council ...	41.116	41.543	40.400	42.670	42.853	43.567	47.496	43.452	3	140.741	+ 10.138
London General Omnibus...	57.576	55.109	59.596	65.970	61.913	60.629	74.008	69.386	17	975.743	+ 30.712
London United	5.468	5,477	5.509	6.264	5.932	6.244	9.350	6.627	17	94.584	+ 4,877
Lowestoft Corporation ...	138	122	122	130	152	216	324	178	29	5.375	+ 726
Maidstone Corporation ...	153	178	168	187	175	223	273	193	4	864	+ 179
Manchester Corporation ...	16.727	16.627	16.991	17.538	17.631	17.895	19.231	18.089	4	66.352	+ 5.734
Metro. Electric Tramways ...	8.521	8.571	8.612	9.528	9.152	9.985	11.757	9.751	17	144.542	+ 4.378
National Steam Car	...	...	2.744	3.497	...	...	5.010	6.515	26	101.052	+ 45.089
Nelson Corporation	170	182	185	235	148	246	230	212	3½	830	+ 59
Newcastle-on-Tyne Corporation ...	4.416	4.474	4.455	4.558	5.055	5.399	5.988	4.884	4	19.490	+ 2.590
Newport (Mon.) Corporation ...	751	717	738	705	817	812	1.022	788	4	3.194	+ 407
New St. Helens and District ...	675	708	714	749	786	754	1.161	814	43	34.831	+ 3,190
Northampton Corporation... ...	499	508	515	554	553	544	754	564	3½	2.100	+ 243
Nottingham Corporation ...	3.333	3.199	3.190	3.268	3.612	3.462	4.018	3.302	3½	11.744	+ 801
Oldham Corporation ...	1.962	2.047	2.094	2.106	2.184	2.411	2.831	2.321	5	11.313	+ 1.321
Portsmouth Corporation ...	1.246	1 833	1.847	2.008	1.373	2.393	3.130	2.303	—	—	—
Preston Corporation ...	799	791	855	813	851	805	1.055	861	4	3.573	+ 315
Provincial...	1.781	1.639	1.610	1.694	1.816	2.090	2.713	1.949	30	51.952	+ 3.433
Reading Corporation ...	617	619	634	643	675	698	864	697	3½	2.454	+ 385
Rochdale Corporation ...	1.406	1.460	1.518	1.566	1.524	1.981	1.892	1.623	4	6.483	+ 873
Rotherham Corporation ...	876	886	930	918	870	1.184	913	910	4	3.984	+ 286
Salford Corporation ...	4.858	4.879	4,978	4.872	4.837	5.824	5.309	5.099	4	20.410	+ 1.542
Sheffield Corporation ...	7.001	7.007	7.315	7.154	7.832	7.664	8.265	7.469	4½	35.429	+ 2.569
Southampton Corporation... ...	1.182	1.124	1.132	1.248	1.180	1.244	1.549	1.319	3	4.301	+ 443
Southend-on-Sea Corporation ...	644	614	618	692	768	789	1.501	930	4	3.334	+ 1.235
South Metro. Tramways	749	713	722	921	1.102	1.171	1.548	1.227	17	17.102	+ 4.994
South Shields Corporation ...	624	611	630	650	700	841	849	749	3½	2.869	+ 669
Sunderland Corporation	1.072	1.274	1.318	1.276	1.018	1.496	1.613	1.373	4	5.502	+ 560
Swindon Corporation	154	139	148	160	164	174	226	177	3	599	+ 135
Tramways (M.E.T.) Omnibus Co. ...	2.311	2.253	2.769	3.050	9.257	9.053	10.663	10.083	17	140.593	+120.870
Tyneside Tramways and Tramroad ...	437	468	465	489	501	509	1.136	510	16	8.342	+ 572
Wallasey Corporation	1,046	1,050	1,079	1,116	1.160	1.222	1.534	1.269	3½	4.753	+ 710
Walsall Corporation	583	572	751	602	612	648	867	598	17	10.375	+ 362
Walthamstow U.D. Council ...	348	642	673	734	455	853	1.076	808	4	3,193	+ 807
Warrington Corporation	...	...	...	...	...	...	...	...	—	—	—
West Ham Corporation	2.565	2.587	2.630	2.786	2.772	2.874	3.452	2.801	3	9.889	+ 1.172
Wigan Corporation	1.413	1.363	1.382	1.420	1.462	1.596	1.837	1.437	3	5.255	+ 561
Wolverhampton Corporation ...	973	981	1.036	1.002	1.033	1.401	1.099	1.018	5	4.727	+ 596
Yorkshire (West Riding) ...	1,320	1.251	1.293	1.432	1.370	1.376	1.746	1.408	17	24.329	+ 1.563

Electric Railways.

NAME OF COMPANY.											
Central London	5.295	5.370	5.322	5.034	5,005	4.418	4.384	4.704	17	86.284	- 4.085
City and South London	2.925	2.916	3,131	2.850	2.622	2.483	2.636	2.590	17	47,359	- 3.700
Liverpool Overhead	1.637	1.560	1.651	1.628	1.635	1.616	1.840	1.764	17	28.121	+ 1.052
London Electric	14.080	14.385	14.875	14.335	14.080	13.305	14.440	13.980	17	246.585	+ 640
Mersey	2.459	2.310	2.300	2.145	2.421	2.259	2.403	2.153	17	38.472	+ 133
Metropolitan	16.036	16.368	16.873	16.603	17.656	17.875	18.660	18.137	17	304.052	+ 26.987
Metropolitan District	13.307	13.273	13.579	12.601	12.927	12,696	13.104	13,006	17	224.203	+ 508

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officals and the principal particulars relating to each undertaking.

The directory is revised as occasion requires, and is the most up-to-date and comprehensive list published.

The Tramway & Railway World can be obtained, post free, at the following rates:
For the United Kingdom—
Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—
Thirty Shillings per annum.

Tel. No.: **2948** Gerrard.
Telegraphic Address; **"Tramigro," London.**

Amberley House, Norfolk St., W.C.

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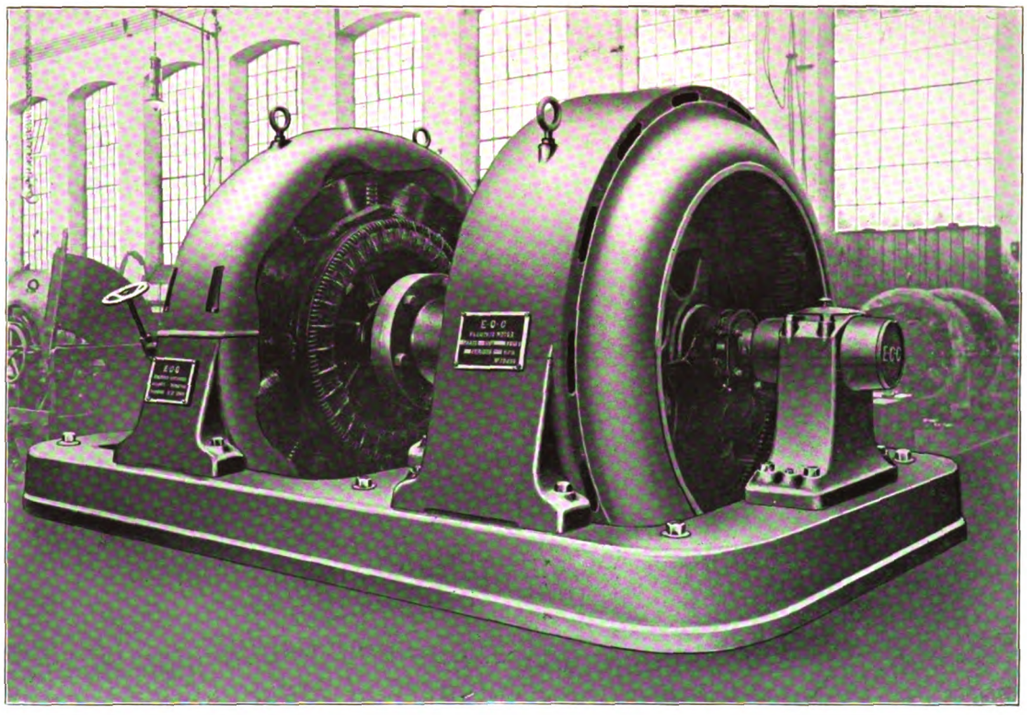
E.C.C.

ELECTRICAL PLANT

AND

SWITCHGEAR

OF EVERY DESCRIPTION.



600 KW. SYNCHRONOUS MOTOR-GENERATOR.

THE

ELECTRIC CONSTRUCTION CO., LTD.

HEAD OFFICE:

TELEPHONES—10920 Central; 2671 London Wall.
TELEGRAMS—"Concordance," London.

ADDRESS—
DASHWOOD HOUSE,
9, NEW BROAD STREET,

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WORKS:

TELEPHONES—75 and 430 Wolverhampton.
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ADDRESS—
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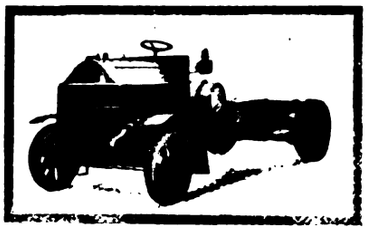
Why buy foreign Cars!

When you can obtain a GOOD BRITISH make.

Write to **British Berna Motor Lorries,** who will be pleased to give you a Demonstration on their famous **British Berna** manufactured in **this** country.



35/40 H.P. 5-Ton British Berna Motor Lorry.

British Berna Motor Lorries, Ltd.

Avonmore Road, West Kensington, London, W.

Telephone—4542 Western. Telegraphic Address—"Klibergar, London."

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CAR LIGHTING SYSTEM

C.A.V. Dynamo Lighting Sets for Commercial and Public Service Vehicles are purposely designed to stand up to the enormous wear and tear of excessive vibration and heavy long distance work. Our type "H" Dynamo is the culmination of the engineer's ideal—greatest strength combined with greatest efficiency—while the batteries are practically indestructible

Further particulars sent free on application

C. A. VANDERVELL & CO.

ELECTRICAL ENGINEERS, ACTON, LONDON, W

TRADE C A V MARK

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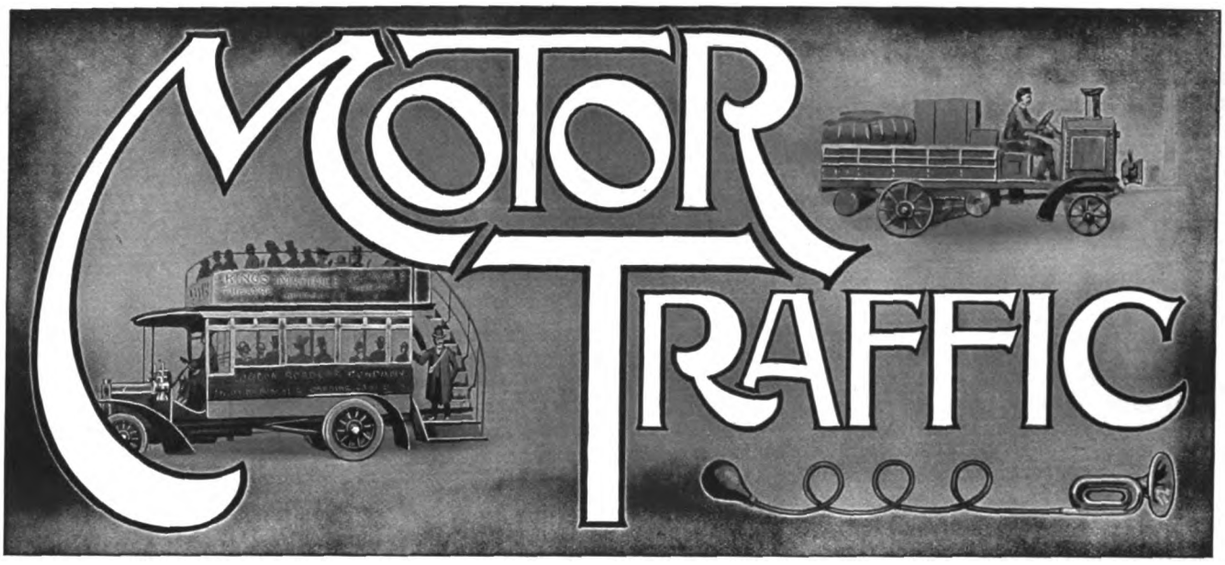

Legislation has been enacted at the instance of the St. Anne's Urban District Council and the Blackpool and St. Anne's Tramways Company, which, if generally adopted, will give local authorities control over motor omnibus and chars-a-bancs routes, prevent the infliction of damage by such vehicles to tramway tracks, and avert competition by motor vehicles with tramway undertakings. Outside of London tramcar and omnibus rivalry has been initiated in only one or two districts, but in each instance the company-owned tramways which were affected have managed to acquire the interests of the rival services. Whether similar legislation would be granted to local authorities owning tramways in the Metropolitan Police area is another matter, but it is instructive to note that in the case of St. Anne's Council there was no opposition on the part of owners of the class of hackney carriages affected, viz., motor chars-a-bancs. Under Clause 29 of the St. Anne's Council Bill the authority are to be given power to provide but not to manufacture motor omnibuses, and under Clause 30 the Council are to be prohibited from running them along any thoroughfare where the tramways company's lines are laid, unless the company give their consent in writing. Clause 31 will confer upon the Council a power that apparently no other local authority at present can lay claim to, namely, that of regulating the routes to be used by omnibuses.

Clause 31, as passed by the Local Legislation Committee at Westminster, reads as appended: "The provisions of the Towns Police Clauses Acts, 1847 and 1889, with regard to hackney carriages, are hereby extended so as to enable the Council to make by-laws regulating the routes which may be used by motor omnibuses when plying within or passing through the district." The only approach to the exercise of such a power is to be found in two or three municipalities—notably Birmingham and Maidstone—as a condition of granting licences to motor omnibuses to come into the municipal districts from outside starting points, the fares being fixed at a figure which does not compete with the tramways. The evidence upon which Clause 31 was granted to St. Anne's Council was given by the clerk to the authority. That official stated that motor chars-a-bancs licensed in Blackpool ran through St. Anne's and Lytham, cutting up the roads, raising dust, and deteriorating the value of the best class houses. The Tramway Company, too, have complained of damage done to their tracks, and they have had to go in for running motor chars-a-bancs themselves in order to meet the competition, a course which the South Lancashire Tramways Company have also decided to adopt. Now that the Council have acquired powers to provide omnibuses and to control the routes followed by chars-a-bancs from outside places, the authority will be compelled to place their roads in a condition fitted for the traffic. In a town so limited in its area, and with the prohibition against the use of roads in which there are tramways, the running of a successful omnibus service will be a matter of great difficulty. Doubtless the Council would find it advantageous to follow the example of Edinburgh in arranging for the Tramways Company to run the municipal vehicles.

Many local authorities in whose areas there are tramways will be interested in what has happened in Stoke-on-Trent and in Oxford in regard to the introduction of motor omnibuses. The most interesting questions involved are what constitutes plying for hire, whether a licensing authority has the right to restrict the number of persons to whom they give licences to run omnibuses, and whether it is legal for a local authority to accept a financial consideration in regard to road maintenance. Stoke-on-Trent Council laid themselves open to criticism for their handling of all three questions at the outset, but matters now give promise of shaping correctly. For some time past the Council had complained of overcrowding on the cars of the Potteries Electric Traction Company, and in order to provide a remedy the company introduced a number of motor omnibuses. This was a temporary step pending the outcome of negotiations with the Corporation for an extension of their leases and the making of an agreement for constructing loop lines and carrying out street improvements, by which means remedies could be more adequately provided. Most other municipal authorities would have expressed appreciation of a response to their complaints being made in the form of providing motor omnibuses, but Stoke's municipal rulers seem only to have regarded the action as an attempt to "rush" them into granting licences. The company put the vehicles into service without permits, and although passengers were required to obtain tickets at various shops the Corporation were on safe ground in inviting a decision on the case in the police court. The convictions which followed were rendered more unpalatable by the Watch Committee granting thirty licences to Greater Omnibus Services, Limited, and for a time the Council appeared to be in danger of themselves taking up an illegal attitude by

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MOTOR TRAFFIC.

not only granting a monopoly but allowing a consideration to be paid for the licences in a sum of £40 per omnibus. A statement to that effect seems to have been made and subsequently denied, and a correspondent has asked, in the columns of the local newspapers, the reason why the Council mislead the ratepayers.

That the Council are not committed to a course which would have rendered them liable to be compelled by mandamus to deal with other applications is a matter for congratulation. It was decided on April 16 by the Watch Committee to inform Greater Omnibus Services, Limited, that unless they placed on the roads before the next meeting the whole of the 30 vehicles for which they had received licences, the committee would consider the advisability of granting licences to any other applicants. At the same time the Electric Traction Company's five vehicles were given licences for allotted routes, and the company were informed that in the event of the London firm failing to put their omnibuses upon the roads by the next meeting the committee would consider the advisability of granting the Electric Traction Company's application for further licences. Apparently amicable relations have been re-established between the company and the Council, for the minutes of the Watch Committee record that the agreeing of the fares to be charged on the five omnibuses then running was left to two members of the committee with the town clerk and the chief constable. That course could only be taken with the consent of the company, as the granting of a licence does not involve the licensee in any obligation as to times of running, fares, or routes. Since then a committee of the Corporation have presented a report recommending an extension of the company's tramway leases until 1940; the construction of various doublings and loops at an estimated cost of £35,000; reconstruction of the rolling stock; the purchase of a number of new cars; and the running of a fleet of at least six omnibuses to be worked on certain routes to be agreed upon. The company are also to pay a way-leave of £2,000 a year, rising in 1927 to £3,000 until 1940. In these terms there is nothing that fetters the future action of the Council as to the licensing of omnibuses to other applicants, but a question may arise as to whether any portion of the way-leave may be regarded as rent for the company's omnibuses.

It is the practice of Parliament, we believe, not to embody wayleaves in Tramway Acts, but to leave that matter to be dealt with in an agreement. Parliamentary Committees have for two years now directed that a certain sum for road maintenance shall be paid in respect of railless trolley traction, but nobody except a local authority is required to secure Parliamentary powers to run omnibuses. Consequently, it is the opinion of counsel, obtained by the Oxford Council's solicitor at the time when unlicensed omnibuses were being run in that city, that Watch Committees must act judicially in determining applications. Mr. Naldrett, the counsel referred to, mentioned the case of Rex *v.* Barry Urban Council, in which the Council entered into an agreement that they would license no one except P. and G. to ply for hire, and those two persons agreed to be bound by certain rules, and to do certain things which were pleasing to the Council. The Council found out that the agreement was *ultra vires* and cancelled it. Mr. Justice Darling, in his judgment, said that if the agreement had remained in force the Council could not have properly exercised their discretion in granting and refusing licences. In face of the foregoing opinion, careful consideration will be required before ratifying a proposed agreement between Oxford Corporation and the companies interested in the horse tramways and the construction of proposed new tramways. In return for extinguishing the penalties to which one company is liable for failing to construct within the specified time, it is proposed to surrender the horse tramway to the Corporation to be reconstructed as an ordinary road, the local authority to grant the company licences to run as many omnibuses as may be necessary, and refuse to license any other person or company to run motor omnibuses during the 37 years' existence of the agreement. The present tramway rental of £800 is proposed to be continued.

MOTOR LORRY TRIALS IN SOUTH AFRICA.

Appended is the report of the judges on the trials of motor lorries which were held in connection with Rosebank Show, South Africa, on February 26:

	Cars Competing.			
	Dennis.	Mass.	Karrier.	Leyland.
Capacity	30 cwt.	3 tons	4 tons	5 tons
Load carried	1·85 tons	2·74 tons	2·8 tons	2·76 tons
	Marks Awarded.			
Petrol consumption ...	(40) 39	34·5	24	31
Reliability	(15) 15	13	15	15
Ease in starting and handling	(15) 12	12·5	13	13·5
Hill climb	(15) 15	8	7	8
Workmanship and suitability for South African conditions ...	(10) 9	9·5	6	7·5
Loading arrangements ...	(5) 2	2	5	2
	92	79·5	70	77

1—Dennis ... ... 92 points.
2—Mass ... ... 79·5 ,,
3 Leyland ... ... 77 ,,
Karrier ... ... 70 ,,

REMARKS.

The work done by all the lorries was on the whole good, no serious accident or breakdown occurring to mar the performance of any of the competitors. The two heavy machines (Karrier and Leyland) would have made better scores if they had carried their full load and kept the speed down. The Leyland in particular would have improved its petrol consumption considerably if the full five tons had been carried.

Taking the machines in order of merit, the performance of the Dennis reflected great credit not only on the machine itself, but on those concerned in the tuning and in the running.

The Mass tractor scored by means of its very efficient radiator and cooling arrangement. With regard to the principle of the front wheels being the driving wheels, the judges are not prepared to give any report on this, as it would require a much longer and more strenuous test to judge this.

As remarked before, the Leyland lorry was handicapped by its small load. For such a large lorry it is particularly easy to handle, and the judges would like to call special attention to this point.

The Karrier machine was unfortunate in losing its fan belt early in the trial, and with some tuning and practice much better results could be obtained. A point of interest in this machine was the provision of a special arrangement for loading, which could also be used for hauling the machine out of drifts, etc., if necessary. This was duly noted, and in future trials more marks will be allotted to devices of this kind. It should be said this machine only arrived from the makers three days before the trials, during which time a body had to be built on; this may to some extent account for its lack of readiness.

In general, more time ought to haye been spent in getting the machines into first-class tune before the trials.

The judges were Messrs. Duncan McMillan, Frank C. Wright, and John G. Rose.

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MOTOR TRAFFIC.

IS THE TOP DECK TO GO?

BY AN OCCASIONAL CORRESPONDENT.

Perhaps as much from the Briton's love of fresh air as from a desire to utilise carrying capacity to its fullest extent, the use of top seats on omnibuses as well as on tramcars has been in time past essentially characteristic of this country, as compared with the States or the Continent.

In tramway services, however, we have rather belied our reputation for indifference to weather by patronising top-deck covers, and the resulting increase of dead weight in the car has, perhaps, in some cases been just enough to so affect the centre of gravity as to make the car top-heavy and upsettable at the higher speeds called for by the travelling public, and on street curves that must of necessity be sharp.

In any case, after the introduction of top-deck covers, the only reason to be offered for the retaining of top seats is that of maximum seating accommodation per wheel truck. The question as to whether it is worth while to use an upper deck at all is one of the oldest to be debated by tramway men, just as it is one of the most unsettled, for no broad principle can be laid down for general adoption. The most suitable type of car varies from one route to another, and from one time of the day to another.

This issue will now, perhaps, again become more debatable than ever in view of the several accidents that have taken place during the past two or three years, though we leave to engineers and managers to prove by calculation and experiment that there is no real danger under more modern conditions in carrying heavy top loads on their tramcars; at any rate the question may fairly be raised whether an equal service can be given with slow-filling and emptying top-deck cars as with the more handy single-deckers, even of much smaller seating capacity.

So far as motor omnibuses are concerned, the matter of top covers has not yet obviously come into the range of practical politics. No one would venture to suggest such a provision or design in view of the wide range and varying camber of roadway on which these vehicles run, and the high speeds at which they must change direction.

The motor 'bus wheel gauge is wider than the average tramway track, and necessarily so too, but even then the stability with heavy top loads may become imperilled as speeds increase; and bearing in mind the objections to staircases from the passengers' point of view, it seems doubtful whether top seats on motor 'buses are quite so advantageous as they at first appear. Can anything like the same, or nearly the same, accommodation be secured on single-deck cars of the char-a-bancs pattern, suitably designed to open or close at the sides according to the season? Probably it is to be regarded as quite impossible to carry 36 passengers seated in a single-decker of reasonable length and width, and mounted on a normal chassis; but 28 and 32 persons can certainly be so accommodated without much difficulty, and there should not be the same objection to a small number of straphangers on a single-deck as when there is a top deck also fully loaded.

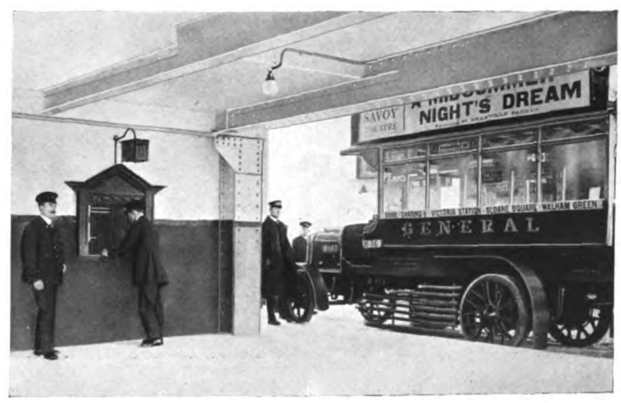
The principal difficulty in regard to single-deckers of char-a-bancs type is that of entrance and exit. For street use, the side entrance could hardly be allowed, although on tourist cars, making long runs and practically fixed stops, it suits perfectly. If, on the other hand, the ordinary rear entrance with steps and platform be employed, it necessitates an aisle for passengers to pass up and down, and the vehicle thereby loses a good deal of seating accommodation.

A 'bus of the latter type would perhaps only seat 24 or 25 persons—a considerable difference from the 34 or 36 of a double-decker—and one can hardly expect managers to forego the chance of increasing the revenue by 50 per cent. per 'bus-mile when passengers are numerous and waiting to be carried. So long, therefore, as speeds are not excessive, and passengers do not clamour to be taken from point to point over short distances in less and less time, it would seem that the top seats on omnibuses will continue for the sake of the greater accommodation at rush hours; but if the services, especially urban, are to be, or can be, speeded up considerably—and the whole tendency of modern times takes this direction—then the question of using single-deckers only will certainly come forward because of the difficulty of keeping good time with the slow-filling or emptying double-deckers.

The congested state of city streets and roads at present helps the double-deck type to continue, owing to the frequent enforced traffic stops. But if and when the street accommodation is increased and improved, it appears likely that the double-deckers will have no time to fully load up, and will therefore present fewer advantages. Such a condition of affairs is not altogether unknown in the streets of London to-day, and it may very likely continue and increase.

HAMMERSMITH TRAFFIC EXCHANGE.

In addition to providing an increasing number of omnibus and underground railway routes for which passengers may take through tickets, the London traffic organisations operating under the direction of Mr. A. H. Stanley are directing attention to the provision of traffic exchanges. Our illustration depicts the first station of that description at Hammersmith. A new garage for the London General Omnibus



Company has been constructed adjoining the Underground Station, and a covered annexe has been erected on the Fulham Palace Road side of the station, so that the omnibuses can pick up and set down passengers under shelter. A booking office has also been provided. A short covered way connects the exchange with the platforms of the District and Piccadilly Railways. The exchange is used by the omnibuses of Service No. 33 (Barnes and East Sheen).

OMNIBUS SCHEME FOR WALLASEY.—The Corporation propose to obtain powers to run motor omnibuses to Leasowe and other summer resorts.

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MOTOR TRAFFIC.

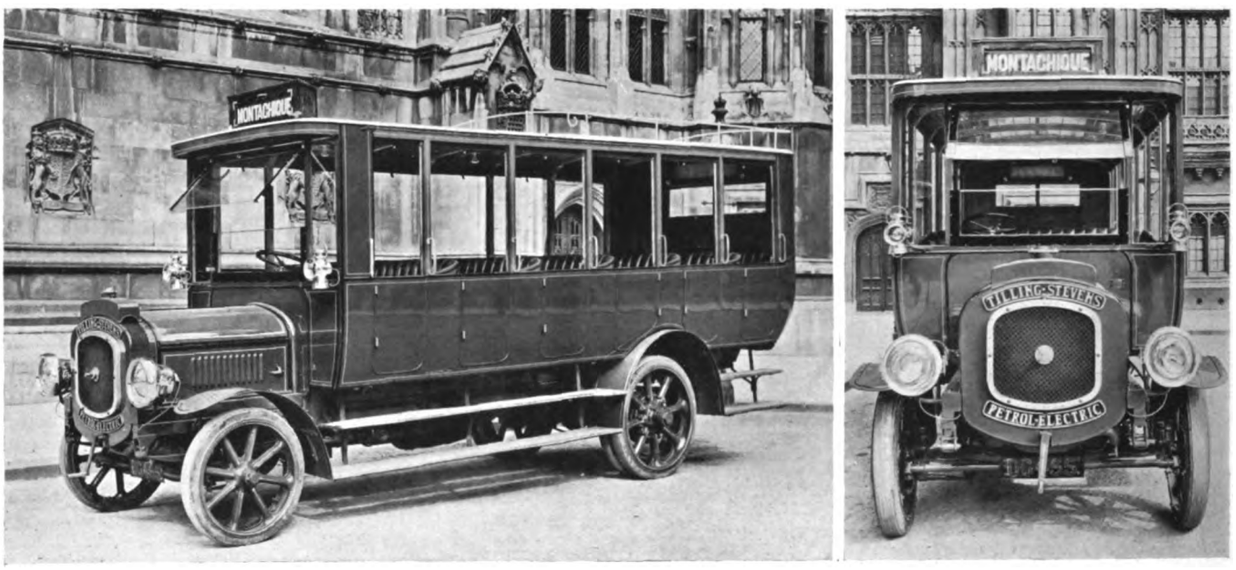
OMNIBUSES FOR LEICESTER.

In pursuance of the powers conferred by the Leicester Corporation Act, 1913, the Tramways Committee have decided to establish a motor omnibus service to Thurmaston village, and to purchase at once three Daimler chassis at £550 each and three bodies from Christopher Dodson, Limited, of London, at £212 15s. each. The additional cost of tires, accessories, and spare parts is estimated at about £200 for each vehicle.

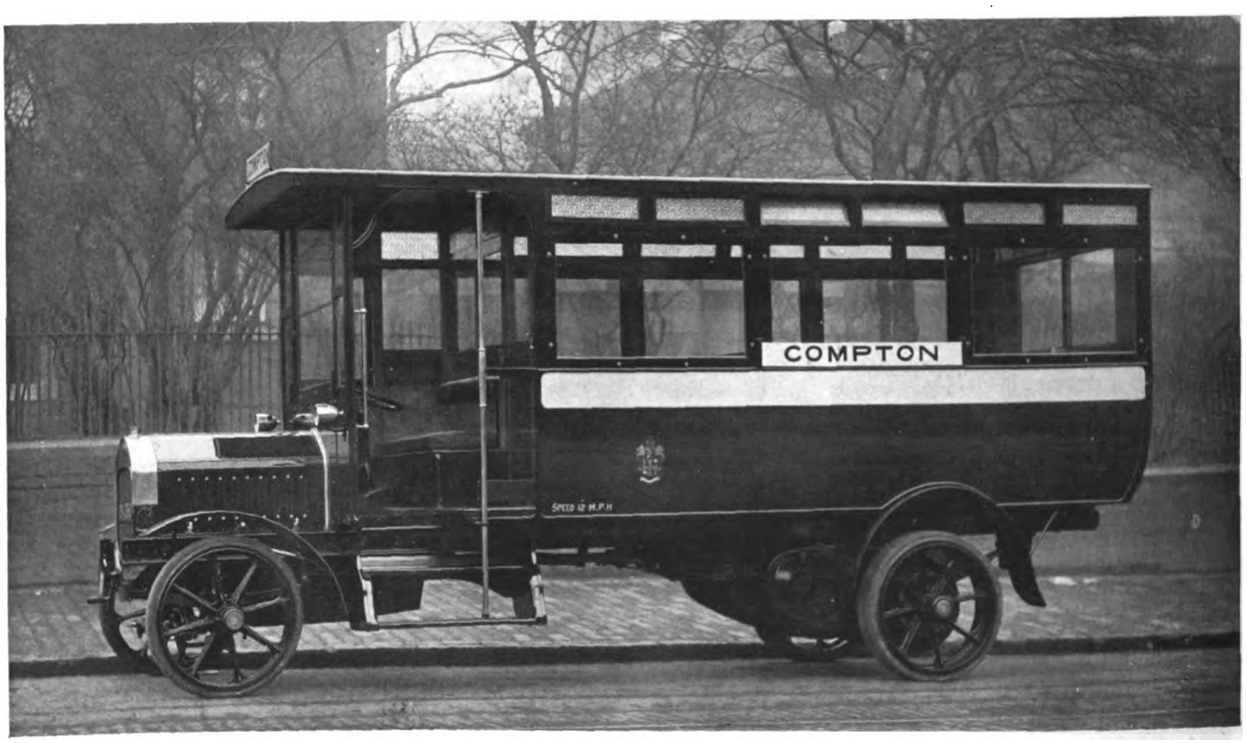
OFFER OF OMNIBUSES TO CALCUTTA.—It is reported that Mr. S. A. Curzon, concessionnaire for the London General Omnibus vehicles, has made an offer to run motor omnibuses in Calcutta. Except that they would have single decks, the omnibuses would be the same as those now running in London.

OMNIBUS FOR LISBON TRAMWAYS.

The vehicle illustrated on this page is a 40-H.P. Tilling-Stevens petrol-electric type, fitted with complete installation of electric lighting, and is being shipped out to the Lisbon Tramways. It has accommodation for 30 passengers inside, and space is provided on the roof for luggage.



Tilling-Stevens Petrol-Electric Omnibus for Lisbon Tramways.



25-h.p. 24-Seat Albion Omnibus Supplied to Wolverhampton Corporation Tramways.

TRAMWAY COMPANY TO RUN A COUNCIL'S OMNIBUSES.—Under an agreement recommended by the Tramways Committee for the acceptance of the Edinburgh Corporation the Tramways Company are to run the motor omnibuses which are now in course of construction. The Council are to take the whole profits or to bear all losses; the cost of running and cleaning to be borne by the Council, and the company to make no charge in respect of internal or office expenses.

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MOTOR TRAFFIC.

DENNIS PASSENGER CARS.

The subjoined illustration shows a single-deck Dennis omnibus for 24 persons, supplied to Messrs. D. J. and A. Thorn, of Porteynon, as a result of favourable reports received by them in respect of other Dennis cars operated by their friends. The omnibus has a strong canopy to carry up to one ton of luggage, and is of a suitable type for suburban and interurban service.

The Dennis ambulance herewith illustrated was recently supplied to the Sheffield Guardians. This is a repeat order, a previous car from the Guildford Works having been purchased by the Board of Guardians a year ago. The body contains a stretcher and seating accommodation for two attendants. It is mounted on a special

Dennis Omnibus at Porteynon.

ambulance chassis with pneumatic tires and very easy springs, and is of a very similar type to the Dennis ambulance supplied to the Liverpool Health Authority, Guildford Joint Hospital Board, West Ham Infirmary, and other public bodies. In the construction of the transmission everything has been done to eliminate all noise, and in this connection the Dennis worm gear is a very strong point, this type of gearing being far more silent than the usual bevel gear. In the ambulance bodies good provision is made for ventilation, and all the

Dennis Ambulance for Sheffield.

interior corners are rounded off to prevent accumulation of dust, and to facilitate cleaning and disinfecting. Room for an additional attendant is provided on the driver's seat, which is particularly well protected from inclement weather. These ambulances are very extensively used, the Metropolitan Asylums Board alone having no less than 60 Dennis machines in service. Among other users are the authorities of Liverpool, Edinburgh, Nottingham, Bermondsey, Hackney, Lambeth, Wandsworth, and also a number of hospitals.

OIL INDUSTRIES EXHIBITION.

The Oil Industries Exhibition, which was held at Earl's Court from March 21 to April 4, presented special interest to those engaged in the motor omnibus business, and indeed, to all engineers concerned in the working of machinery. In these two directions alone the Exhibition was well worth visiting, first to see the various grades of motor spirit used as fuel for internal combustion engines, and second, to note the oils and greases for lubricating the engines and gears.

Among the exhibits of this class, were the Bowring Petroleum Company, Limited, of Finsbury Court, E.C., who manufacture and sell Mex motor spirit; "All's well" lubricating oils and paints (specially suited for iron and steelwork of all kinds); and also lamp oils. The Anglo-Mexican Petroleum Products Company, Limited, make a speciality of fuel oil and also of solid and liquid bitumen—Mexphalte, and Fluxphalte—manufactured in particular for road surfacing, and therefore possessing great interest to those whose vehicles have to run on roads not always designed for easy travel or small wear and tear of rubber tires. This company exhibited some extremely interesting models of road sections treated with the products named. The British Petroleum Company were well to the fore with a finely arranged stand showing Shell and Crown motor spirits—their two chief grades. The Anglo-American Oil Company showed three grades—Pratt's Perfection, Pratt's II., and Taxibus.

It is noteworthy that the greatly increased cost of light motor spirit has forced users into employing the heavier grades, and, truth to tell, these latter give as a rule more power though not so clean in the cylinders and valves, and not so easy for starting. As both these disadvantages can be overcome, the economy of using a cheaper heavy spirit is obvious. Messrs. Townson and Mercer had an interesting display of chemical laboratory apparatus required by every large oil user, and besides the three leading oil interests (Standard Oil, Shell, and Mexican), who had each a representative display of lubricating oils and greases, there were similar exhibits derived from Russian oils (Leon and Company, 101, Leadenhall Street, also Benckendorff and Company, Baku) and from independent sources. Benjamin and Company, 61, St. Mary Avenue, E.C., made a good show, also the Lubricating and Fuel Oils Company. It is to be hoped that the next exhibition will include samples of benzole and other substitutes for naphtha or motor spirit, such as are called for even now in view of the high prices to be paid for spirit derived from petroleum.

SOUTH AMERICAN MOTOR PROJECT.

COMPETITION WITH A BRITISH-OWNED RAILWAY.

The *Review of the River Plate* states that a recent telegram from Santiago (Chili) gives details of a transportation scheme projected by the firm of Wiedgan and Cia., of Valparaiso. The project referred to is one for the establishment of an automobile transport service between Los Andes and the city of Mendoza. The tariff proposed is one-half that charged by the Transandine Railway, which was constructed and is owned by a British company. Passages for officials and employees of the Government would be only $50. The syndicate would undertake the conservation of the road in return for a Government guarantee on a capital of $750,000. The principal articles of transport for which a profitable business is anticipated would be wood elaborated in the country, or imported, barrels in sections, hogshead staves, sulphur, cement, galvanised iron, conserved fruits, etc. The service would necessarily be for only a portion of the year, from October to March or April according to climatic conditions. The proposers of the scheme are confident of giving a satisfactory and regular daily service. Garages would be installed along the road, containing spare motor vans and all repairs and accessories. Trials have been made on the Chilian side showing that the journey upwards can be made in 90 minutes, and the downward trip in 70. On the Argentine side, the road is said to be in bad repair, and a sum of $60,000 is estimated as necessary to put it in condition to make the downward journey in 2½ hours. A subvention, the amount of which is not stated, but described as modest, has been asked from the Mendoza Provincial Government, that province standing to benefit greatly by the service. This subvention would be applied to road maintenance. Once the company is formed, repairs would be effected on the roads so as to permit automobiles to carry 12 or more passengers, and motor lorries 8,000 kilos of merchandise. Then it would be possible, the proposers add, to charge freights of from $10 to $12 (at 18d. per $) per ton, instead of the $20 to $70 charged by the Transandine Company.

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MOTOR TRAFFIC.

THOMAS TILLING, LIMITED.

IMPROVED RESULTS—PROVINCIAL OMNIBUS SERVICES.

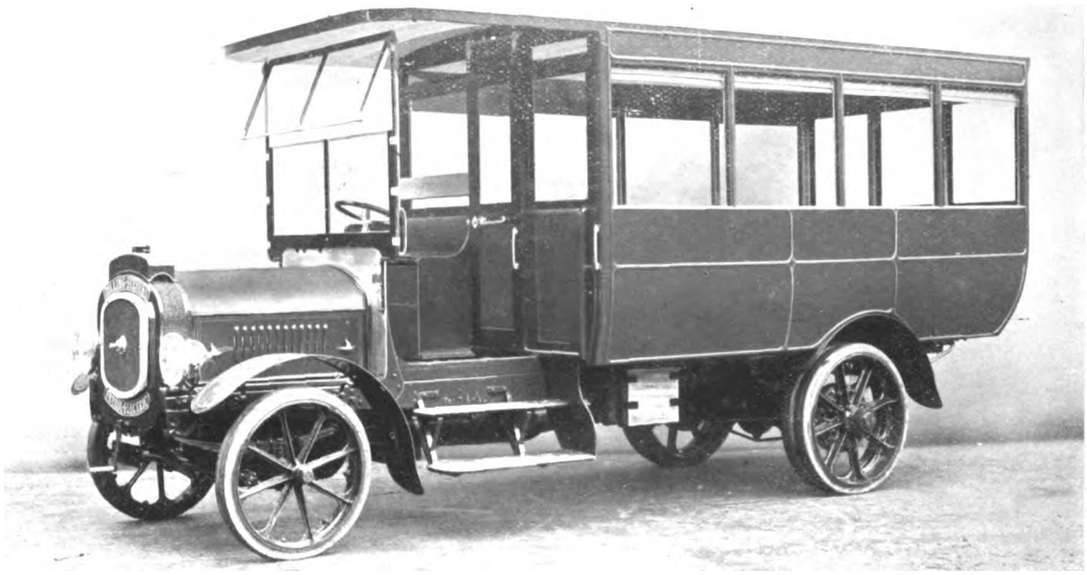
Mr. Richard S. Tilling presided at the seventeenth annual meeting of Thomas Tilling, Limited, which was held on April 16 at Cannon Street Hotel. The secretary (Mr. C. Loveridge) read the notice convening the meeting and the auditors' report. For 1913, the directors report stated the profits were £44,569, while £16,120 was brought forward. The directors recommended that £2,700 be written off freehold properties, £2,106 set aside against expenses of debenture issue, and £430 written off goodwill. £1,500 was placed to reserve fund for obsolescence, and they recommend a dividend of 5 per cent. on the ordinary shares, carrying forward £16,782.

In moving the adoption of the report the chairman said the business, which began in a very small way 70 years ago, illustrated the value of small beginnings. It had been subjected in a most remarkable degree to municipal competition, through which the money of the ratepayers, practically of their own shareholders, had been used to compete with the business. If he possibly could he wanted to remove a wrong impression on the subject of motor omnibuses in relation to tramways. There seemed to be a general impression that the omnibus trade was out to compete with tramways, and that was the impression which he wished to try to remove. Omnibus proprietors were simply out to earn their own living and to carry on their own business. In that connection he might say that the omnibus proprietor to-day was the survivor of the old coach proprietor of years gone by. If they had evolved a more popular method of carrying the public than the tramways, he did not think it could be said that they did it for the purpose of competing with the tramways. At the present time there were running only about the same number of motor omnibuses as the horsed omnibuses which they replaced.

Turning to the report, he said that the turnover had been very largely increased, and the profits doubled. That was rather the more remarkable as they were only able to make use of the additional capital for a portion of the year. They ceased to run the horse omnibuses only about the first week in January of this year, so that for a large portion of the year they were still running horsed omnibuses at a loss, because they had not motors ready to take their place. At the end of the year they had only nine horsed omnibuses running, and now there were only three. With regard to the sale of omnibuses last year, they had to sell a large number at the end of the year, and that was responsible for a loss of between £17,000 and £18,000, which was met out of revenue, and, of course, would not recur.

W. A. STEVENS, LIMITED.

The business of W. A. Stevens, Limited, which was the manufacturing side of the company, and in which they had a preponderating interest, had presented a very satisfactory balance-sheet. During the first three months of the present year they had orders in hand equal in amount to the whole of last year's turnover, and that was only a very small beginning of a very large business. Their type of petrol-electric omnibus was running in Australia, New Zealand, South Africa, and in the principal cities of this country. They also manufactured chars-a-bancs, delivery vans, etc. He mentioned that to show that there was another side to this business, which looked like being a very big affair, and with which they were very gratified. During the year they had established some provincial motor omnibus services, and that side of the business would probably be very much enlarged. In order to avoid any unprofitable rivalry, they had endeavoured to work with the local interest which they found there. They had also developed a business in heavy haulage, and had bought a number of steam lorries, all of which were being profitably employed. Their relations with the rest of the omnibus trade continued to be of a very satisfactory nature. The prospects for the future were very good. So far as they could see into the future, they did not think that there was any reason why the old prosperity which the horse business enjoyed should not be continued, even if it is not enhanced.



40 h.p. Tilling-Stevens Petrol-Electric Char-a-Bancs for Pretoria Municipality.

PROFIT SHARING IN MOTOR WORKS.

The Ford Motor Company (England), Limited, has established a 48-hour week for all their factory employees, and are forthwith paying the same wages for 48-hour week as have previously been paid for 50-hour week. The company will give to their employees during the forthcoming twelve months the sum of £50,000 in addition to their wages. This will not be a wage increase, but distribution of profits. It will be added, however, each week to the regular wages of the men. In subsequent years the distribution may be more or less than the £50,000 set aside for the current year, future years' allocation being dependent upon business conditions. A minimum wage of 1s. 3d. per hour will be established by the addition of the profit distribution to wages. The present minimum wage is 10d. per hour. A novel feature of the scheme is the establishment of a sociological department, where a small staff, including a doctor, will institute any inquiries necessary to guard against wastrels and to secure sober and industrious men.

A NEW SERVICE AT HASTINGS.—Early in April a service of motor omnibuses was put on between the railway station and the top of High Street, where a connection is made with the tramcars.

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MOTOR TRAFFIC.

ELECTRIC VEHICLE NEWS.

AN OPEN QUESTION.—Reporting on the subject of the motor vehicles owned by Westminster City Council being maintained by direct labour instead of by contractors, the Highways Committee say, among other things: "It is not certain what class or classes of motor will eventually become paramount, whether petrol, steam, or electricity. In this connection we are informed that the city of Paris have recently acquired a number of electrically-propelled wagons for municipal work."

ELECTRIC VEHICLES FOR A MUNICIPALITY.—It has been decided by the Wellington (New Zealand) Council to purchase two electric vehicles for use in connection with the tramways department, one being for the collection of parcels.

SUCCESSFUL UNDERTAKING AT VIENNA.—The Austrian Daimler Company are providing the chassis for the construction of electric omnibuses to take the place of the horse omnibuses run by the municipality between Stephansplatz and Volksoper. The substitution is the outcome of an offer by the Appumulatoren Fabriks, A G., at Vienna after nearly two years' successful running of accumulator vehicles.

BARNES COUNCIL AND ELECTRIC DUST VANS.—After consideration of a report by Mr. Tomes, their surveyor, in favour of substituting six electric motor vehicles for the collection of house refuse in place of 12 to 14 horses and carts, the Urban Council of Barnes have decided not to arrive at a decision until the surveyor is in a position to show an electrically-propelled dust van in actual use. Mr. Tomes obtained estimates from four firms who supply electric vehicles, and he drew up the following statement of costs based on a wagon driven by Tudor batteries with a tipping body taking just over one ton of refuse:

Motor vehicles:	£	s.	d.
Interest and repayment	63	12	0
Interest and repayment on one-fifth cost of charging apparatus	4	18	0
Man's wages	78	0	0
Electrical energy	32	0	0
Tires	50	0	0
Insurance	10	0	0
Maintenance of battery	40	0	0
Repairs, oil, waste, etc.	11	10	0
	£ 90	0	0

For 300 days, equals 19s. 4d. per day.

Horse vehicles:	£	s.	d.
Horse and man per day	0	10	6
Repairs and maintenance of cart	0	0	6
	£0	11	0

A horse, cart, and man, with an extra filler to each two carts, collected three and a half loads per day; the horse and cart travelled about two miles per hour. The motor van would average about 10 miles per hour, and would collect seven loads per day. It would therefore be necessary to have at least five motor vehicles to replace the 10 horses, the average number now employed. On the present system the cost of collecting 10,500 loads per annum in 300 working days would be:

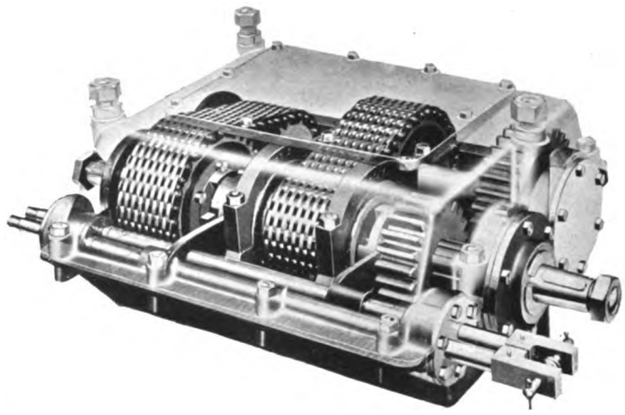
	£	s.	d.
300 by 10 horses per day at 11s.	1,650	0	0
For electric motors:			
300 by 5 motors at 19s. 4d.	1,450	0	0
Saving	£200	0	0

ROAD MOTOR DEPARTMENT OF THE LONDON AND NORTH WESTERN RAILWAY.—The development of the road motor vehicle department of the London and North Western Railway has necessitated greater attention being given to the mechanical and commercial supervision of the department. In all there are 111 such vehicles, made up of 47 passenger conveyances, 25 goods carriers, 27 parcel vans, four steam wagons, four carriers, and four broughams. Mr. F. W. Dingley has been appointed to the new post of superintendent.

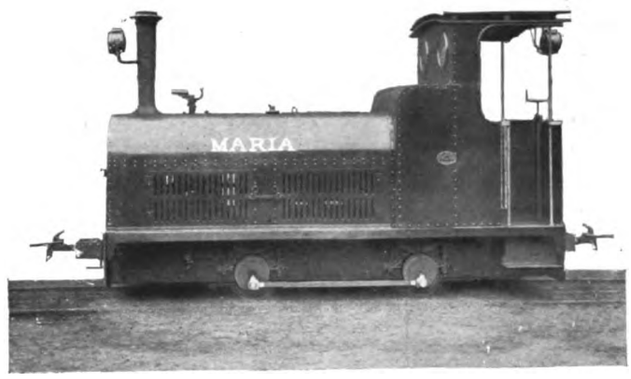
SCOTTISH MOTOR TRADE SCHEME FOR NATIONAL DEFENCE.—The following particulars are being furnished by members of the Scottish Motor Trade Association, in connection with the scheme for national defence suggested by that organisation: (1) The approximate number of 3-ton lorries or commercial vehicles available; (2) the approximate number of 30-cwt. lorries or commercial vehicles available; (3) the approximate number of chars-a-bancs and omnibuses; (4) whether any of the above vehicles have been earmarked or subsidised through any other channel. Approximate figures are required, and will be used for statistical purposes. The arrangements for the motor car section are now completed.

THE COVENTRY GEAR BOX.

The enclosed gear box illustrated below has been designed by the Coventry Chain Company, Limited, of Coventry. It is driven by Coventry noiseless chains, the arrangement of which will be seen at a glance, as the cover of the box in the illustration is shown in the "ghost" form. The box has two speeds forward and two reverse, transmitting 35 H.P. at 1,000 revolutions per minute, the ratio of reduction being 2·62 to 1. The box is 32 in. wide, 22 in. long, and 14 in. high, and weighs 560 lb. The chain wheels have 21 and 34 teeth, $\frac{3}{4}$ in. pitch, and the chain combination is 7 by 8.



Special Gear Box made by Coventry Chain Company.



Internal Combustion Engine Fitted with Coventry Special Gear Case.

This enclosed special gear box was recently supplied to Messrs. W. G. Bagnall, of Stafford, for use with the internal combustion engine, shown in the accompanying photographs, to which it has since been fitted. As may be seen from the illustration the box is of compact design, and it is an excellent piece of work.

A LONDON OMNIBUS DIVIDEND.—The New Central Omnibus Company have declared a dividend for the six months ended December 31 at the rate of 12½ per cent. per annum, free of income tax.

REPORT ON TRIALS OF DUST WAGONS.—Heston and Isleworth Urban Council have been recommended by the Highways Committee to purchase an electrically-propelled wagon at a cost of £840, as the result of a trial made by that committee of three types of wagons for the collection of house refuse. The wagons were a 4,000-lb. Edison electric, tare weight 7,184 lb.; 3-ton Garrett superheated steam wagon, tare weight 4½ tons; and 3-ton Thornycroft petrol wagon, tare weight 7,448 lb. The comparisons are based on a loan being obtained for seven years at 4 per cent., the cost of the vehicles being, electric £840, steam £617, and petrol £815. Tires were estimated for on the basis of two years' life. At present the work is done by horse vehicles at a cost of £404 16s. per annum, and the cost of the motor vehicles worked out at £333·175 for electric, £338·133 steam, and £404·442 petrol.

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MOTOR TRAFFIC.

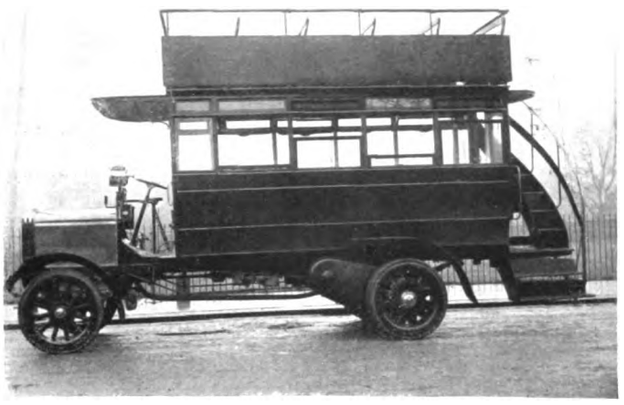
"COMMER" CARS.

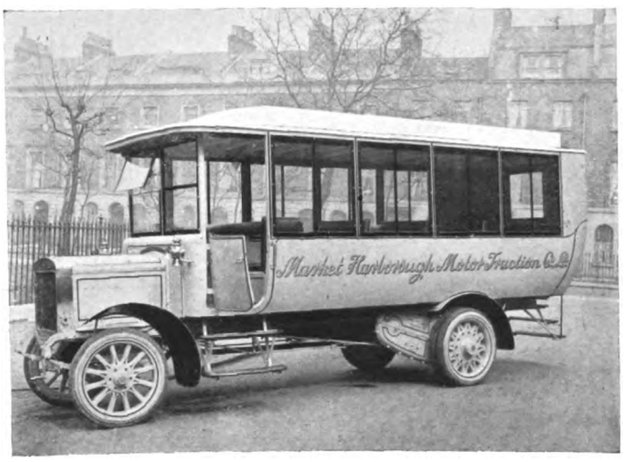
The four photographs on this page illustrate some fine types of passenger vehicles produced at the Luton Works of Commercial Cars, Limited.

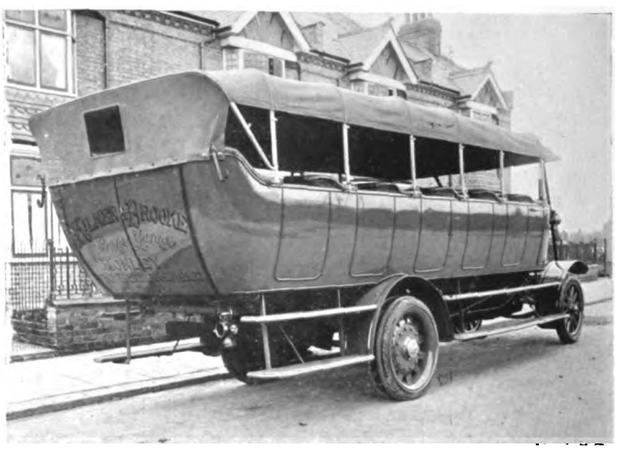
The first is of an omnibus, which is painted royal blue with red wheels, and which has been shipped to India to be used by an Indian Rajah for transporting the harem from place to place.

The second shows three chars-a-bancs, which represent one day's delivery. The front and back vehicles are for use in Ireland by the Thompson Motor Car Company, and the one in the centre by the South Devon Garage and Motor Touring Company in Devon and Cornwall.

The left hand lower photograph represents a 34-seat all enclosed car recently supplied to Market Harborough. The remaining picture shows a 34-seat char-a-bancs which was recently delivered to Honley (Huddersfield).







Products of the Luton Factory of Commercial Cars, Limited.

WHIT-MONDAY MOTOR VAN PARADE.

The Victoria Palace Theatre of Varieties has been taken by the Commercial Motor Users' Association for their annual entertainment to the drivers who enter the annual parade of commercial motors. The eighth parade is being held on Whit-Monday next, under the patronage of his Majesty the King, and over 1,500 drivers and their friends will be entertained at a special matinée. A film of the parade, taken in the morning, will be shown, and champion drivers will be presented with their cash awards, championship badges, and diplomas. The guests of the Association at the official luncheon, to be held at the Royal Automobile Club immediately after the conclusion of the parade, will be present during the performance.

LONDON GENERAL OMNIBUS COMPANY'S DINNER.

Mr. C. J. Cater Scott, chairman of the London General Omnibus Company, who presided at the sixth annual dinner of the official staff, at the Hotel Cecil, on April 18, responded to the toast of the company, proposed by Mr. John O' Connor, M.P. He paid a warm tribute to the work of the managing director, Mr. A. H. Stanley, whose absence through illness was much deplored, and referred appreciatively to other officers of the company. The omnibuses last year carried over 676 million passengers, the mileage being about 105 millions. The receipts amounted to over £3,250,000, of which £1,500,000 was the amount of the annual pay roll. The staff numbered 18,000, of whom 10,000 were drivers and conductors; and the Associated Equipment Company, in addition, employed about 1,200. The number of omnibuses operated was 3,000, running over routes measuring 520 miles. The result of the Easter traffic was specially gratifying, nearly 2½ million passengers being carried on Easter Monday alone. The toast of "The Visitors" was proposed by Mr. H. E. Blain, operating manager, and replied to by Mr. W. Joynson-Hicks, M.P., and the health of the chairman was proposed by Mr. R. S. Tilling. The attendance numbered nearly 500.

MOTOR OMNIBUSES OR TRAMCARS FOR AN ALL-NIGHT SERVICE?—In the course of his report on the suggested all-night service of tramcars, the general manager of the Glasgow Corporation Tramways says: "It has been frequently suggested that in order to test the need for night cars, motor 'buses might be run on several routes. If, however, it is possible to operate the cars without undue interference with the operations of the night staff, there is no doubt that the most economical means of providing a night service is by tramcars. Within limits it is quite possible to operate such a service in Glasgow."

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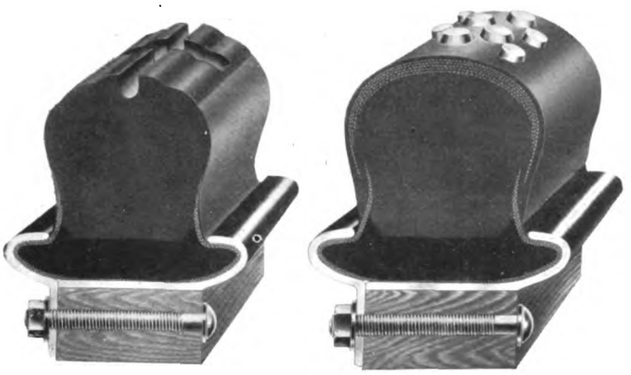
MOTOR TRAFFIC.

NEWS FROM THE TIRE COMPANIES.

AVON.—A contract has been placed by the Great Western Railway with the Avon India Rubber Company, Limited, for Avon band tires for their motor omnibuses during the ensuing twelve months. The Great Western have also given the same firm a large contract for the supply of mechanical rubber goods for railway purposes during the same period. On London General omnibuses, where the firm have a number of sets always running under close observation, 12 Avons recently gave an average of over 25,000 miles each, and three or four were still running at the time the records were analysed.

NEW CONTINENTAL TIRE.—A new solid tire has just been produced by the Continental Company to meet a specific and extensively growing demand. Its special feature is extra resiliency, which renders it essentially suitable for fast travelling light commercial and passenger vehicles of a carrying capacity up to 25 cwt. The accompanying illustrations show that the shape itself guarantees a certain resiliency, but the rubber employed in its construction is much more resilient than that necessarily used in solid tires for heavy use. This solid tire



New Solid Continental Tires.

is specially suitable for light delivery vans and mail services, station omnibuses, travellers' vehicles, taxi cabs, and other passenger conveyances. It will supply a much needed want that daily becomes more pressing, for the pneumatic tire, which it will supersede, has rendered but imperfect service in the class of work indicated. Moreover, the new tire, in the matter of expense, presents a further advantage over the pneumatic tire, for it is guaranteed for 10,000 miles. A steel studded pattern concave solid tire, shown above in the view on the right, has also been put on the market.

CONTINENTAL COMPANY'S REPORT.—The report of the Continental Caoutchouc und Gutta-PerchaCompagnie for the year ended December 31 states that the gross profits amount to £618,457, and the net profits, after deduction of £180,778 for depreciations, to £437,679, that is to say £124,827 more than in the previous year. It is again intended to distribute a dividend of 45 per cent. on the increased share capital. The directors would have been in the position to distribute a higher dividend out of the considerably larger profits; they preferred, however, whilst adhering to the careful policy as regards dividends hitherto followed, to use the larger profits for strengthening the internal position of the company. It is further stated that the extension of the plant had made it possible to obtain a larger output, and to give prompt delivery. Continental tires, as well as Continental solid tires enjoyed the highest reputation. The increase in the company's capital produced a premium of £133,168, which was assigned to the ordinary reserve fund, bringing same up to £901,616. The ordinary reserve fund, the special reserve fund, the Delcredere fund, and the guarantee fund, amount altogether to £1,076,616, or more than 143 per cent. of the share capital. The report concludes: "Business during the current year has been, so far, good throughout. We are of opinion that equally good business may be anticipated for the year now in progress."

DUNLOP.—Since the opening of the Dunlop Rubber Company's Works, Belsize Road, Kilburn, London, a year ago, the solid tire department has developed with remarkable steadiness: the staff and plant have been increased from time to time, and before long the question of extension will require to be faced. Despite the pressure, orders are completed with a punctuality that is most gratifying, and no customer need dread having trade interfered with owing to delays in fitting or repairing tires. It does not seem known to all commercial users that solids can be repaired as effectively as pneumatics. A cut can be healed, a piece that happens to get knocked out can be replaced by another piece; indeed, damage of any kind to the band will be remedied the same day as received, at a cost that is trifling considering the extended mileage that can be got out of the tire. Solids should be watched as closely and as regularly as pneumatics, as constant inspection means prolongation of service.

LIGA.—A booklet has been issued, entitled "How to Tell a Good Solid Tire." It is written by a member of the Commercial Motor Users' Association. In the course of his remarks the author says: "It is evident that in the near future the more highly resilient and extra mileage tires, made on the original endless band system, will become the 'hall-mark' of economy in the running costs of commercial vehicles, and that the 'cast' or re-claimed rubber form will largely cease to exist." The author sets forth the conditions which are required to surround the manufacture of tires, and says that he was "recently much attracted by a place that fulfilled conditions which, to the solid tire maker, are ideal—a factory designed in accordance with best modern practice, adjacent to a vast forest, and enjoying the fine, crisp mountain air. It is erected alongside a rapid stream, which during many months of the year provided the power for driving enormous water turbines. This is an example of the lowest cost of production consistent with the 'hall-mark' of quality. . . . . Attached to the works were elaborate chemical and mechanical laboratories and engineering shops for the production of the firm's own steel bands. It is from these works that the remarkable Liga tire is produced on the latest Continental pattern, and it is the condition under which Liga tires are manufactured that is the basis of their super-resiliency and extra mileage. These tires are made from a 20,000 mile grade of virgin Para rubber compound, and run anything from 15,000 to 25,000 miles, under normal conditions. Each tire carries the usual guarantee of 10,000 miles against faulty manufacture."

TRAFFIC INSTRUCTION FOR CHILDREN.—Teachers in the London elementary schools are enforcing upon their classes the need for the observance of a number of precepts printed on a wall-card that has been issued to all the schools. Among the warnings are the following: "Don't play 'Last across.' Don't try to get a free ride on or behind any vehicle. You may fall off and be run over by another vehicle coming up behind. The police can take you up for this. Don't sit on the kerbstone. Don't run after your ball or hoop if it runs off the pavement. If your hoop falls into the tramway slit the driver of the next car will get it for you."

A Recent Albion Delivery—4-ton 32-h.p. Van.

NORTHERN GENERAL TRANSPORT COMPANY.—Mr. C. R. Green, presiding at the annual meeting of the Gateshead and District Tramways Company on March 30, said the directors had recommended the shareholders to accept the offer of the Northern General Transport Company for the consolidation of the interests of the shareholders of the various Tyneside companies. The powers of the Gateshead company as to the operation of motor vehicles for passengers and goods were insufficient to enable it satisfactorily to develop the business. In accordance with the scheme, the motor omnibus undertaking was sold to the Transport Company, and the profits of the sale were transferred direct to reserve. There was considerable scope for the development of the motor services, and the shareholders who had accepted the offer should reap considerable benefits from their exchange.

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MOTOR TRAFFIC.

ROADS FOR MOTOR TRAFFIC.

Colonel R. E. B. Crompton, C.B., consulting engineer to the Road Board, in the course of a paper read before the Manchester Association of Engineers, said that with some produce handled under existing conditions there were five or six distinct operations, all of which cost time and money, to be added to the actual cost of haulage. A large proportion of the goods, too, suffered by handling. It would be seen, therefore, what scope there was for the designing engineer to obtain the full advantages of carrying perishable foodstuff and similar materials in road vans specially designed to allow of easy loading, little damage during hauling, and easy unloading. There was no doubt that in that way great economy could be introduced by suitable design and labour-saving devices. He appealed for an improvement in design such as would make the motor vehicle less harmful to the roads, and he pointed out that a good deal remained to be done to the vehicles themselves to make them carry goods or passengers at the lowest possible cost, *i.e.*, when the running cost of the vehicle was added to the cost of upkeep of the roads.

Suggestions for More Axles and Larger Wheels.

Railway engineers knew that two-axle locomotives or even two-axle wagons were looked on with disfavour on account of such two-axled vehicles punishing the rail ends and joints to a far greater extent than when multiple-axle wagons were used. It was practically certain that the same applies to the roads, and that the tendency to wave deformation, which was everywhere observable, could be minimised by providing some of the vehicles with more than two axles. When two-axled vehicles were used they always tended to accentuate and

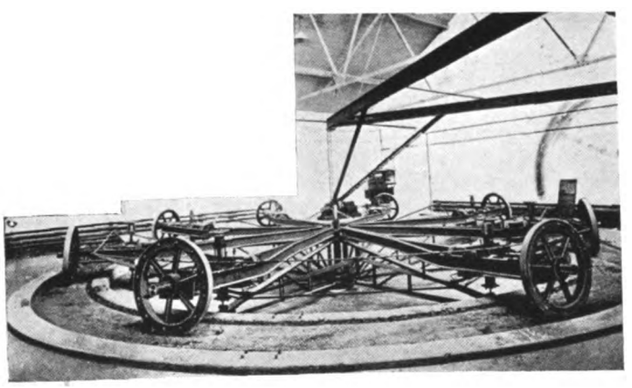

Fig. 1.—Road Wear Testing Machine.

increase wave formation by punishing the hollows and failing to wear down the high places. With a three or four-axled vehicle the reverse was the case; the crests were punished and the hollows were eased. Apart from this, the vehicle designer could help the road engineer by increasing the diameter of his wheels, as the tendency to deformation was greatly increased when small wheel diameters were used. Unfortunately, this increase of wheel diameter somewhat increased the cost of construction and militated against easy loading, especially when the vehicles had to be loaded over the sides, but there was little doubt that there was a very strong feeling on the part of road engineers that the weight on axles using wheels of small diameter had been overdone; that even those sanctioned by the Local Government Board were too great, and as they were frequently exceeded the roads were punished to an unfair extent. Better results for everyone would be obtained if the loads were divided over a greater number of wheels, and if the wheel diameters were somewhat increased.

Value of Bitumen as a Binder.

In referring to the problem of road design, Colonel Crompton stated that he had recently made some interesting calculations which showed that on some of the roads leading out of large towns, where a change had been made from the old water-bound macadam surfaces to improved surfaces resembling asphalt, the owners of rubber-tyred vehicles using the roads had already benefited to an extent which seemed at first unbelievable. He could show that this change on one of the main roads leading out of London was benefiting the owners of rubber-tyred vehicles using that road to the extra extent of £2,000 per mile per annum. He had no doubt that there were many roads in the immediate vicinity of Manchester, Liverpool, or Birmingham where similar saving could be shown. The road engineeer had now to face a difficult and complicated problem. He had to provide for the entire width of his carriage way a surface which required the lowest horse-power to haul the vehicles over it. The surface had to be such as to maintain itself in good condition throughout extreme vicissitudes of temperature, moisture, hot sunshine, frost, or fog. It ought to be slightly elastic, completely waterproof, economical, very stable, and of materials which cost little. Bitumen was a substance differing in many important physical characteristics from the tars and pitches obtained from gas works. This was only now beginning to be understood, but his views were supported by some of the leading physicists, and probably afforded a solution to many of the different problems which had hitherto been inexplicable. As far as he had been able to observe, the broad line of distinction between the coal-tar pitches and the earth-oil bitumens was that the former pitches had always the characteristics of a liquid within the working temperatures on our roads. They possessed surface tension, and consequently had a natural tendency to reduce their surfaces and form rounded masses. The viscosity of these pitches, too, was very susceptible to temperature changes, so that a coal-tar pitch, which was so soft as to run freely at a temperature of sunshine, would be as brittle as glass, be friable, and chip in frosty weather. On the other hand, pure bitumens possessed the opposite characteristics of solids. They had apparently no surface tension, but were sufficiently elastic to make them an extremely valuable material for road making.

Production of Stronger and Non-Skidding Surfaces.

In summarising the results which be had obtained during research with bitumen binders, Colonel Crompton stated that the Americans found out at an early stage that the aggregate to which the bituminous binder is to be added should contain in addition to graded sand a certain proportion of extremely fine pulverised dust, which they called the "filler," and that better results were obtained by using filler in nearly equal amount to the binder itself than by omitting it. His own experiments had shown that they were correct in this, and that the

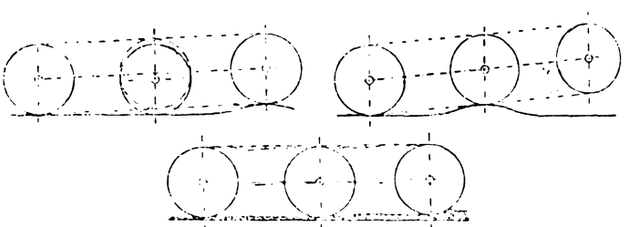

Fig. 2.—Diagram Showing Action of 3-Axle Roller.

filler itself played a very important part. If they wished to make up an artificial sheet asphalt containing 10 per cent. of bitumen, it was better that this should be in the form of 10 per cent. of bitumen, and 10 per cent. of filler, and 80 per cent. of sand, than that it should be 10 per cent. of binder and 90 per cent. of sand. The reason for this was somewhat obscure, but he thought they might suppose that the cause of it was somewhat analogous to that of the house painter who found that certain mineral powders mixed with his oil covered a greater surface than others. By combining extremely finely powdered filler with the bitumen, therefore, they got a bituminous paint of great covering power, and consequently increased the surfaces of the aggregate that they could effectually cover and cement together with a given weight of bitumen. He had made a considerable number of experiments to determine how the quantity of filler could be varied with advantage, and had produced some remarkable results. By adopting certain dusts which were produced in industrial processes in the North of England, as a filler to take the place of the more expensive Portland cement or lime powders previously used, he had actually increased the toughness of his specimens, measured by the number of blows they would stand without cracking, as much as 50 per cent., and with no increase of cost. One feature that had to be borne in mind when designing a sheet asphalt pavement was that it must contain a certain proportion of grains of sand sufficiently large to make it wear to a gritty surface, so as to afford good foothold for men and horses, and to possess non-skidding qualities for motor vehicles. It was found that the addition of quite a low proportion, not exceeding 10 per cent. of grains of sand lying between 10 mesh and 20 mesh sizes, produced this result. There was no advantage in increasing it, but an absolute disadvantage, as it made the surface more permeable to moisture, and reduced its wearing quality.

Machine for Testing Road Wear.

In an earlier paper read before the Institution of Mechanical Engineers, London, entitled "Mechanical Engineering Aspects of

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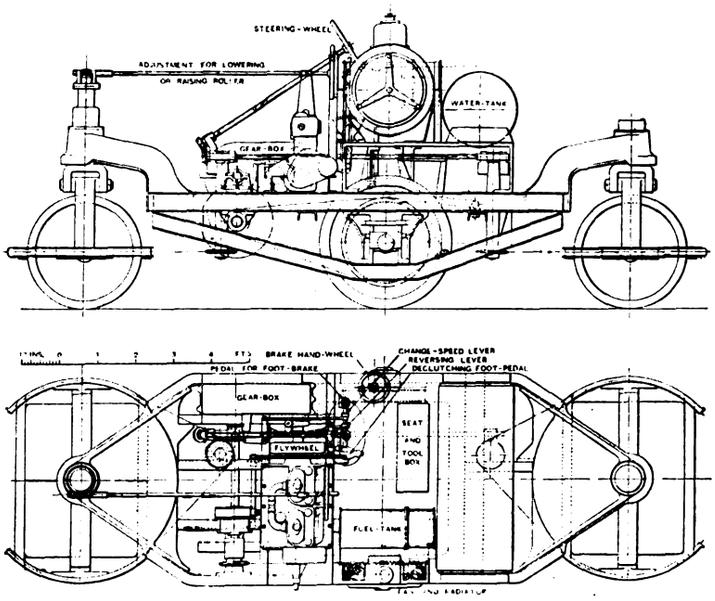
Road Construction," Colonel Crompton elaborated his treatment of the subjects he had dealt with at Manchester, and added a great deal of information concerning machinery for road making. He mentioned that confirmation of wave forming action of self-propelled vehicles "has been obtained from the experimental work carried out with the road machine at the National Physical Laboratory. At an early stage in the test of trial roads at Sidcup and elsewhere, it was seen that the best of the systems of modern construction would take years of heavy traffic to develop any measurable wear or even deformation. The author was called upon to design a more rapid method of comparing the efficiency of new methods of road construction, by subjecting the material laid in a circular roadway, or path, to the wear of wheels driven by electric power. The construction of such a road machine was sanctioned. The author collaborated with Dr. Stanton in the design of the machine, which was completed and set to work early in 1913. Fig. 1 gives a general idea of its construction. It will be seen that it consists of a circular path, in which is laid the special road-surface to be tested. On this circular path the frame carrying eight wheels revolves at any desired speed from three miles up to 20 miles an hour. The wheels at present in use are one metre diameter, 3 in. wide, and can be loaded up to one ton per wheel, or about 800 lb. per in. width of tyre. Eight of them therefore cover 24 in. as the extreme width of the test path, but in order that they may not leave ridges or ruts in the tested surface, each of the wheels is provided with a positive end-traverse of 1 in. inwards and outwards from its fixed radial position. It makes this complete traverse of 2 in. in one and three-quarter complete revolutions of the frame. The wheels are spring loaded; they are attached with the motors that drive them to hinged frames, and are pressed into contact with the test road by springs held down by a revolving eight-armed cantilever frame immediately below the hinged arms. The upward pressure on the hinged arms is absorbed by a ball thrust-bearing on the centre pillar. It is intended eventually to vary the diameter of the wheels, and to test wheels fitted with various forms of rubber tyres. Means are now provided for measuring the shape of the surface due to wear or deformation, and the path itself is to be heated, cooled, or wetted, to imitate weather conditions. All the tests that have been hitherto carried out show a marked tendency to produce wave deformation. The machine itself has a harmonic period, and this reduces the time necessary to test a surface, and to compare its merits with others in resisting this wave deformation. Although valuable information confirmatory of the author's ideas on wave formation have already been obtained from the running of this machine, he does not pretend that during these preliminary tests they have more than touched the fringe of this important subject, but there is little doubt that they will eventually obtain information of a valuable character, both as regards the cause of the wave formation, and the best methods of resisting it.



Crompton-Tapp 3-Axle Motor Roller.

Initial Waves on Newly-formed Road Surfaces.

"In considering what might be done to improve the vehicles so as to minimise their tendency to deform the road by wave formation, the author's ideas were first directed to the original initial waves, which are always found to some extent on newly-formed road surfaces. The chief reason why no surfaces but those of wood pavement, or of the sheet asphalt laid with a trowel and adjusted by hand-beaters, are free from initial harmonic waves, is that the road-roller used when, as is usually the case, the rolling is carried out in the direction of the line of traffic, however skilful the operation of rolling is performed, always produces waves which eventually are intensified by the traffic; for when an ordinary two-axle roller is first brought on to newly-spread road material, it alternately pushes the material forward until a certain resistance to forward movement is encountered, and then rolls over the accumulation thus formed in front of it. This alternate action is periodic, and the wave length depends on the diameter of the roller-wheels, the total weight, the distance between axles, and to some extent on the speed at which the rolling is carried out, but in all cases the finished surface is waved. It is found to be much easier to roll to a surface of small wave height certain soft road materials, such as blast-furnace slag, or some of the limestones, than is possible with the harder and more incompressible granites and basalts, but in no case is the finished surface ever truly flat and waveless. When the traffic comes on to the road, there is little doubt that the small waves left by the rolling serve as a starting point for the shorter-period waves eventually formed by the traffic itself; and as it appeared to the author that all two-axle vehicles must cause this action, it occurred to him that it would be better to commence by modifying the design of the rollers themselves so as to produce a non-wave-forming roller. He has succeeded in doing this by adopting the three-axle principle, and it is probable that the same three-axle principle might be with advantage extended to all vehicles carrying heavy loads

Three-Axle Roller.

"The idea of designing this roller came to the author when he was studying the three-axle wagons used by Colonel Renard for the well-known Renard train. Colonel Renard's ideas of perfect road transport were that all the vehicles of his train should be provided with three axles, and they are the only vehicles which the author has seen in use which have a real tendency to correct the wave formation caused by the ordinary two-axle vehicular traffic. These experiments showed that the Renard train was exceedingly easy on the road. The rolling resistance, and therefore the power required to propel the train, measured by its fuel consumption was found to be very small, and this has confirmed the author's ideas that much might be done by the designers of vehicles developing this three-axle principle. The three-axle roller that has been constructed and is in use, has certainly produced surfaces freer from waves than has heretofore ever been the case.

"In order to obtain a perfect levelling action of the rolled surface, the weight taken by the three rollers must constantly vary so that it can exert maximum pressure on the high places and a minimum pressure on the low ones. At the same time there must never be less than sufficient weight on the centre driving roller to enable it to have the required driving adhesion. In this design these conditions are met by mounting the centre roller only on springs, in such a way that it can fall below, but cannot rise above a fixed point relative to the front and rear rollers. The action of the rollers is then as shown in the preceding diagrams. In Fig. 2 the front roller is seen on the summit of a wave or high place, the centre roller having sunk below its normal position, which is indicated by the dotted lines; when the centre roller passes over the same summit as shown, it takes practically the whole weight of the roller, and which tends to reduce its height. If the centre roller were not provided with springs as described, the rear roller would tend to leave a depression when in the position shown in this figure. Fig. 2 also shows the action of the machine when rolling freshly-laid road material; it will be seen that the rolling surfaces of the rollers are not quite in the same plane, but that the centre one is then slightly below the level of the other two. This gives a very light pressure during the first time of rolling, which gradually increases each time the roller comes back on to the cooler and harder material already rolled; this is due to the fact that, as the road surface becomes ess yielding, the weight becomes more concentrated on the central roller, giving the much-desired effect, just as if a light roller was first employed followed by a heavier one, but the change from light to heavy being more gradual. The difference in the level of the rollers is adjustable by the arrangements shown on the front steering-head

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and extends over a range so sufficient that, if necessary, the rear roller can be permanently raised from the ground, concentrating 90 per cent. of the total weight on the centre roller. The front roller always has sufficient excess of weight to give steering effect. The drawings show that the wheel bases are not equal. This is purposely arranged as a further precaution against the possibility of producing recurring waves. In the present design the diameter of the centre roller is 3 ft. 6 in., and that of the end rollers 3 ft., but in the new design the centre roller has been altered to 4 ft. The width of the rollers over all is 4 ft., the long wheel base 8 ft., and the short wheel base 6 ft. 6 in. The distribution of weights can be varied by the hand-wheel adjustment."

MOTOR TRAFFIC NOTES.

No Commercial Exhibition in 1915.—The Commercial Vehicle Committee of the Society of Motor Manufacturers and Traders have decided against the holding of a commercial vehicle exhibition in 1915.

Impending Openings in Persia.—The United States Consul at Teheran reports that as the Persian Government contemplates a road-building scheme and also the improvement of the roads connecting the chief cities, there should be a demand before long for motor cars and lorries in Persia.

Possible Scope for Motors in a Scottish District.—Efforts to induce the Caledonian and North British Railway Companies to take up a scheme for constructing a light railway from Stonehaven to Bervie have proved unsuccessful. The future course of the promoters has not been made known.

Electric Lighting for Omnibuses.—Vandervell and Company, of Warple Way, Acton Vale, London, W., have received a contract from Southend Corporation for the lighting of six motor omnibuses with the "C.A.V." system of lighting, consisting of front, rear, and inside lights, at a total of £292 1s. 5d.

Question of Omnibus Powers for Glasgow.—The City Council have withdrawn from the Glasgow Provisional Order the clauses relating to powers for the running of motor omnibuses beyond the city termini. The proposal had met with opposition from county and burgh authorities and railway companies.

Leeds Railless Extension Scheme.—While the Wharfedale Rural Council have decided to support the Leeds Corporation's project for installing railless trolley cars from Guiseley to Otley and Burley, the Menston Parish Council have expressed opposition, but would approve of a tramway or motor omnibuses.

Tramway Companies' Motor Services.—Record results are reported by the Bristol Tramways and Carriage Company, and by the Bath Tramways Company, as regards their tramcar, chars-a-bancs, and motor omnibus traffic at Easter. As early as 6 a.m. people began telephoning for seats on the Bristol company's motor vehicles.

Railless Cars or Omnibuses for West Bromwich?—No decision has been arrived at on the question of whether the railless trolley car or the motor omnibus shall be adopted by the Corporation for the service which is required between Greets Green and Old Church. Members of the Council recently made a trip in a motor omnibus.

Openings for Motor Vehicles in Buenos Ayres.—Statistics issued by Buenos Ayres Traffic Department for 1913 show that there were only 243 motor goods vehicles in use, while there are as many as 37,091 carts. Of private motor cars there were 2,470, motor taxis 3,040. Horse carriages numbered 1,443, horse taxi-cabs 3,218, and livery stable carriages 1,376.

Where Omnibuses Meet Public Needs.—The Tramways Committee of Edinburgh Council have decided to postpone the promotion of a Provisional Order for the construction of a tramway and the running thereon of self-propelled cars to the village of Corstorphine. Councillor Graham, on whose motion this decision was come to, contended that the route was sufficiently supplied with motor omnibuses.

Omnibuses Required at Birmingham.—The 10 motor omnibuses which were running from Selly Oak to Rednal at Easter were quite inadequate to meet the demands. It is not possible to increase the number until Parliament passes the Corporation bill which has been lodged. A local newspaper states that an immense number would have been required to have dealt with all the people who desired to use the vehicles on Easter Monday.

Motor Omnibuses or Railless Trolley Cars for Bombay?—Mr. F. C. Rimington, of the Bombay Tramways and Electric Supply Company, has informed the Bombay Development Commission that in his opinion motor omnibuses cannot be profitably operated to meet the problems he has to face. The company, he adds, would be willing to install the railless trolley system on certain routes if a public demand for it can be shown.

Omnibus Powers Outside of Newcastle-on-Tyne.—Weetslade Urban Council having asked the Newcastle Tramways Committee to run a service of motor omnibuses from Gosforth Park tramway terminus into their district, the committee decided to give instructions for the presentation of a petition to Parliament for additional provisions in the Newcastle-upon-Tyne Corporation Bill, 1914, extending to the Urban District of Weetslade the power to run motor omnibuses at present sought in respect of the Longbenton Urban District.

An Experiment at Wigan.—The Tramways Committee have decided to experiment with a motor omnibus between Coppal and Standish tramway terminus. At the April meeting of the Council, Councillor Farr expressed surprise that a local firm of builders, whose machines were being ordered by the War Office, had not been approached in the matters of obtaining prices of vehicles and terms for hiring. Councillor Fletcher, chairman of the committee, replied that no definite action had yet been taken.

Scope for Another Omnibus at Perth.—Speaking at the annual dinner of the Corporation tramway employees, the chairman of the Tramways Committee stated that the motor omnibuses were bringing a large number of people into the city from outside districts, thus materially increasing the business of the tradespeople. Mr. W. G. Snell, the tramways manager, mentioned that the revenue from the omnibuses had increased by £200, and the passengers by 18,728, and he trusted that these figures would induce the Council to allow the department to obtain a third omnibus.

Reading and The British Automobile Traction Company.—After correspondence and an interview with the Mayor, who is chairman of the Reading Tramways Committee, the British Automobile Traction Company have stated that the business which would result from the establishment of suggested omnibus services would not, in itself, be such as to justify them in undertaking it, but that if it were undertaken by the Corporation in connection with their tramways system the company would be glad to give advice and assistance in the purchase of suitable rolling stock and in the establishment of the services.

Motor-Maintenance by Direct Labour or by Contractors?—Reporting on this question, the Highways Committee of Westminster City Council states that a sub-committee had submitted figures which lead to the opinion that ultimately it might be to the Council's advantage to establish their own workshops and undertake the maintenance of their motor vehicles. At the present time they are not prepared to recommend the adoption of that course. The capital cost would have to be loaded with compensation for the termination of existing contracts. In accordance with this recommendation, the Council renewed the contract with Leyland Motors, Limited, for the maintenance of No. 9 wagon for a period of two years, the annual charge being £55.

All-Night Tramcars or Motor Omnibuses?—At the April meeting of Glasgow Corporation, at which the decision was arrived at to institute an all-night service of tramcars, Councillor R. Scott said that he would have no objection to the running of motor omnibuses with rubber tires. In Glasgow many people were housed in tenements. There were 117 tenements to the mile, and he calculated that if they ran their cars over 50 miles of lines they would disturb about a quarter of a million sleepers. He had been told by the very best medical authority that noise and din were more destructive of the nervous system when people were asleep than when they were awake. Councillor Kirkland, chairman of the Tramways Committee, said his bedroom window was at a stopping-place, but he was never disturbed by the cars.

West Bridgford Municipal Omnibuses.—Mr. H. P. Day, chairman of West Bridgford Urban Council, informed the members on April 24 that up to April 8 the five motor omnibuses had carried a quarter of a million passengers, the receipts being over £900. The previous weeks the receipts were £95, and when the fact was taken into consideration that the scheme was only yet in its experimental stage, they would agree with him that it was a marvellous success from the beginning. It was impossible, however, for an undertaking of this nature to be worked on a paying basis from the commencement, as there were the Parliamentary and capital expenses, and also an allowance for depreciation which had to be met. When it was considered that they had to pay the capital off in five years, it would be seen that it was impossible for the expenses to be met out of the income. The expenses of the Parliament bill alone had been returned at £1,500, and it seemed a great pity that the district should be put to that very great expense in order to carry out a project to which there was no real objection outside a few opponents.

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF SUNDERLAND.

TRAMWAYS DEPARTMENT.

TICKETS.

The Corporation are prepared to receive tenders for the supply of Tickets for use upon their tramcars.

Full particulars may be obtained on application to Mr. A. R. Dayson, General Manager and Engineer, Tramways Offices, Sunderland.

Tenders, in sealed envelopes endorsed "Tender for Tickets," must be delivered at my office not later than 12 o'clock noon on Thursday, May 28 instant.

The Corporation do not bind themselves to accept the lowest or any tender.

H. CRAVEN,
Town Clerk.

Town Hall, Sunderland,
May 5, 1914.

COUNTY BOROUGH OF SUNDERLAND.

TRAMWAYS DEPARTMENT.

RAILS.

The Corporation are prepared to receive tenders for the supply of Fifty Tons of Steel Tramway Rails in accordance with the British Standard Specification, Section No. 2.

Further particulars, if required, may be obtained on application to Mr. A. R. Dayson, General Manager and Engineer, Tramways Offices, Sunderland.

Tenders, in sealed envelopes, endorsed "Tender for Tramway Rails," are to be delivered at my office not later than 12 o'clock noon on Thursday, May 28 instant.

The Corporation do not bind themselves to accept the lowest or any tender.

H. CRAVEN,
Town Clerk.

Town Hall, Sunderland,
May 5, 1914.

JODHPUR BIKANER RAILWAY.

Tenders are invited for :—

(1)—2,358 Tons of Steel Flat Footed Rails (B.S.), 50lb. per yard.
9,220 Pairs of Steel Fishplates for the above.

(2)—58 Tons of Dogspikes.
25½ Tons of Coach Screws.

As per specifications and forms of tender, which can be obtained from Messrs. Rendel, Palmer and Tritton, 13, Dartmouth Street, Westminster, S.W.

For each specification a fee of one guinea will be charged, which cannot under any circumstances be returned.

Tenders must be delivered at the above address before noon on Wednesday, May 20, 1914.

BOROUGH OF KEIGHLEY.

CORPORATION ELECTRICITY DEPARTMENT.

The Electricity Committee of the Keighley Corporation are prepared to receive tenders for :—

One 750 kw. Converting Plant, suitable for converting electrical energy on the Alternating Current 3-phase system at 6,600 volts, 50 periods per second, to Direct Current electrical energy at 500 volts, with a range of 10 volts up or down.

Tenders will be received for either of the following types :—

(1) An Asynchronous Motor Generator.
(2) A Motor Converter.
(3) A Rotary Converter with Static Transformer.

In all cases the set must be suitable for starting up on the A.C. end. No tender will be considered unless the contractor is willing to put the work in hand subject to the sanction of the Local Government Board for the necessary loan, and confirmation by the Council. The set must be running on commercial load not later than September 30, 1914.

Specification and form of tender may be obtained on application to the undersigned by payment of a deposit of one guinea, which will be returned on receipt of a *bonâ-fide* tender.

The latest date for receiving tenders will be on Monday, May 25, 1914. The Committee do not bind themselves to accept the lowest or any tender.

HARRY WEBBER, A.M.I.E.E.,
Borough Electrical Engineer and Tramways Manager.

Electricity Offices, Coney Lane, Keighley,
May 5, 1914.

LIVERPOOL OVERHEAD RAILWAY.

CONTRACTS FOR STORES.

The Directors are prepared to receive tenders for the supply of the Company's ordinary requirements of the following Articles during the twelve months ending June 30, 1915 :—

1 Bolts and Nuts.
2 Electrical Fittings.
3 Files.
4 Fluid (Boiler).
5 General Stores.
6 Indiarubber Material.
7 Iron and Steel.
8 Ironmongery.
9 Oil and Grease.
10 Packing (Engine).
11 Screws.
12 Soap (Liquid, etc.).
13 Tapes (Insulating).
14 Timber.
15 Waste and Sponge Cloths.

Further particulars and forms of tender may be obtained on application to 31, James Street, Liverpool, where parties are requested to call and examine the samples before tendering. The sample room will be open for this purpose on May 20, 21, and 22, between 10 a.m. and 1 p.m. and 2 p.m. and 4 p.m. The Company's patterns cannot be sent away for inspection, all being exhibited at the before-mentioned address. Tenders properly endorsed and addressed to the General Manager must be sealed and posted so as to be received not later than 10 a.m. on Tuesday, June 2, 1914. Any sent otherwise or not in special envelope (provided for each contract) will not be considered. The Directors do not bind themselves to accept the lowest or any tender.

E. J. NEACHELL,
General Manager.

31, James Street, Liverpool.

CARDIFF CORPORATION.

The Corporation invite tenders for the supply, delivery, and erection of Sundry Steel and Cast Iron Pipe Work and Small Feed Tank.

Specifications, forms of tender, and drawings may be obtained on application to Mr. Arthur Ellis, Electrical Engineer and Manager, Central Offices, the Hayes, on payment of a deposit fee of £1 1s., which will be returned upon receipt of a *bonâ-fide* tender.

Tenders to be endorsed, "Tender for Pipework," and to be delivered at my office on or before 10 a.m. on Thursday, May 28, 1914.

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POSITIONS VACANT.

TRAFFIC MANAGER FOR ELECTRIC TRAMWAYS.

Wanted at once for Pernambuco, Brazil. Experience in similar post and fluent Portuguese are essential qualifications. Salary, £900 per annum. Apply Secretary, Pernambuco Tramways and Power Company, Limited, River Plate House, London, E.C.

PERMANENT WAY SUPERINTENDENT.

Wanted experienced Superintendent for Electric Tramway Permanent Way. Must be competent to make surveys and prepare drawings. Reply, stating age, experience, and salary required, to Box 232, c/o The Tramway and Railway World, Amberley House, Norfolk Street, London, W.C.

POSITION WANTED.

ENGINEER.

With practical and commercial experience, desires appointment. Several years' experience in Electric Traction work in all details from construction to running. Thoroughly accustomed to management and control of men. Ten years general manager. Highest testimonials. Box 77, The Tramway and Railway World, Amberley House, Norfolk Street, London, W.C.

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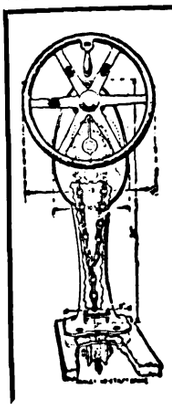

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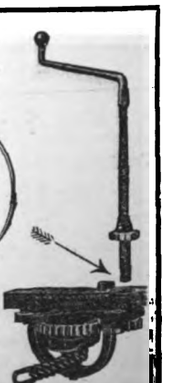

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SATURDAY, MAY 9, 1914.

THE "OCEAN"
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"SAFETY FIRST" MOVEMENT.

Already in the form of inscriptions in the cars tramway managers of the United Kingdom have taken steps to guard against two of the most prevalent forms of accidents to passengers, but mishaps in boarding and alighting and from running down behind the cars continue to form the majority of the casualties. In Sheffield during the past year 157 females were injured and one killed through leaving cars when in motion. Following a period of warnings to passengers by conductors, the department have begun to institute prosecutions, the first person proceeded against being a woman who had injured herself so severely that she was unable to attend the court. At Glasgow last week, during a discussion on accident insurance by the Corporation, it was stated that many of the passengers did not know how to leave a car, for when alighting they faced away from the driver. The frequency of the accidents in alighting, combined with the trouble and expense entailed in the maintenance of the claims department, may be advanced as two among a number of reasons for considering whether the time has not arrived for instituting a "safety first" campaign among the car employees and the general public, including the drivers of motor and horse vehicles. One outcome of the education of the latter would be the lessening of obstruction to the cars, as well as reducing the number of accidents due to collisions. The "safety first" movement had its origin on American railways, with a view to lessening the accidents sustained by employees, and during the past six months it has been vigorously taken up by the Great Western Railway Company in this country, through the medium of illustrated articles in their magazine. The directors of the company place so high a value on the work that they have decided to reprint the articles in pamphlet form. On the other side of the Atlantic the movement has spread to the tramway companies; in Canada Mr. Gaboury, the superintendent of the Montreal Tramways Company, is the first to take it up. In the pages of a little folder, accompanied by a brief letter addressed to "Dear Friend," he has set forth before the employees the precautions to be taken to ensure safe working. This has been followed up by the issue of a letter to the owners and drivers of every vehicle in the city, together with a list of "Don'ts," and already several hundred of them have promised co-operation. One special reason why Mr. Gaboury's publication for the car employees might be adopted in this country is to be found in the fact that every motorman does not bring to his work an experience of the rules and courtesies of the road gained as a driver of a horse vehicle. The men, too, would take more kindly to this form of exhortation than to increased vigilance on the part of the inspectors. The latter form of activity, consequent on a serious accident, has aroused some criticism during the past week on one of the leading northern systems. Another useful departure is to be seen in the placing of wall cards in the London schools.

LEEDS CAR EMPLOYEES' AGREEMENT.

Through the firm attitude that they took up during the late strike of the municipal employees on syndicalist lines, the Leeds Corporation demonstrated to their workmen that the ratepayers and their representatives have the determining voice. It is to the credit of the tramway men that little more than a day or two sufficed to prove to them that defeat was in store for the dupes of the agitators who attempted to hold the city to ransom, and they returned to their work. Even if it were practicable for the rest of the city's employees to come to their aid if required when the car hands' agreement with the Council expires in October next, it may be assumed that the defection of the tramway men during the last strike has lost them the support which they were promised. In considering the terms of the reply to be given to the notice that the tramway men have handed in to terminate their present agreement, the Tramway Committee will have less need to take into serious account the prospect of another strike. The Committee will not be doing their duty to the ratepayers unless they insist upon receiving some guarantee that the men intend to abide by any new agreement, for the Leeds tramway men occupy the position of having excelled the rest of the country in resorting to unjustified strikes. It was only in the summer of 1911 that they left work in order to obtain better terms than those which the Committee had offered them. When the strike had lasted a day, Sir George Askwith was accepted as arbitrator, and the agreement then arrived at contained a clause providing that six months' notice must be given on either side to terminate it. That obligation was discarded in the strike of last December, and the men thus demonstrated that they cannot be trusted to abide by their signed declaration. As the result of the adventure with that section of labour agitators who hold that all is fair in warfare against capital, the men assisted to involve the city in a heavy loss, and a just return for their action would be for the Tramway Committee to determine that the present agreement must be renewed for at least another year. Unless the breaking of an agreement is accompanied by that form of penalty—which is the only one to make each man realise his responsibility—the strike habit will not be broken.

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PRIVATE BILL LEGISLATION.

Birmingham Corporation.—Proposals for the construction of seventeen tramways and to provide and work omnibuses were among the powers asked for in this Bill, the tramway clauses in which occupied a Committee of the House of Commons on April 29 and 30. The only opposed proposal was the construction of a tramway in Broad Street to enable the enormous number of passengers brought by converging tramways to travel to the busy part of the city. The Committee refused the request for a tramway past a hospital in Easy Row, and granted the Broad Street line subject to the powers not coming into operation until the thoroughfare has been widened, and the provision that there should be no terminus at the bottom end. The Chairman (Mr. Middlebrook) said the Committee were impressed with the importance to the tramway scheme of the city generally of providing a connecting link between what had been termed the north and south section of the whole undertaking. There was no opposition to the motor omnibus clauses.

Bristol Corporation.—On May 1 Mr. Talbot, K.C., on behalf of the Corporation, put forward a clause to embrace the decision of the House of Lords' Committee to place upon the Council the obligation to purchase those portions of the Bristol Tramways Company's system in respect of which they have the option to purchase in May next year, and also to bind the Corporation to purchase the outlying portions on terms to be agreed with the company, or failing agreement subject to arbitration. Mr. Talbot's clause, put forward on behalf of the Corporation, was objected to by Mr. Lloyd, K.C., who described it as placing the company absolutely in the hands of the Corporation. He put forward a clause on behalf of the company, and Lord Lytton, chairman of the Committee, said this carried out in principle the Committee's intention. The proceedings were adjourned until May 4, when the following purchase clause was agreed to and the Bill was ordered to be reported with amendments to the House for third reading :—

Notwithstanding anything contained in the Bristol Tramways Acts 1872 to 1911 (including in that expression where used in this Section the St. George and Hanham Light Railway Order 1898) the Corporation shall within six months after May 1, 1915, proceed to purchase and the company shall sell to the Corporation the whole of the undertaking of the company upon the terms and in manner following that is to say :

As to so much of the undertaking (other than the Light Railway portion thereof) as is within the City as the same existed January 1, 1904, upon the terms of Section 43 of the Tramways Act 1870;

As to the remainder of the undertaking (including the Light Railway portion thereof) upon such terms as failing agreement shall be determined by an Arbitrator to be fair having regard to all the circumstances of the case.

Failing agreement the amount to be paid for the undertaking is to be determined by an arbitrator nominated by the President of the Institution of Civil Engineers.

London County Council.—On May 4 Mr. Soames's Committee of the House of Commons heard the application for powers to construct a double tramway, a mile and three-quarters in length, at Eltham, on the main road from London to Maidstone. The new line would connect the existing tramway at Lee Green with the line at Well Hall Road, Eltham, which serves Plumstead and Woolwich. The estimated cost of the line is £67,000, and of works in connection therewith £21,000, whilst £37,000 is required for the acquisition of land.

Middlesex County Council and Omnibus Traffic.—A Committee of the House of Commons presided over by Colonel Bathurst began on May 5 consideration of the Middlesex County Council's Bill for the construction of the Great West Road out of London. Mr. Wakelam, the county engineer, spoke in support of a clause which seeks to prohibit the use of the road by motor omnibuses unless the companies pay towards the cost of maintenance. Middlesex, he said, had had more experience of damage by motor omnibuses than any other county. They had had to re-surface Bath Road at a cost of £33,000, and were re-constructing Golders Green Road at a cost of £55,000 owing to motor omnibus damage. Work was also in progress on St. Albans Road, because of the same traffic, at a cost of £14,000. The Council had a scheme before the Road Board for re-surfacing at a cost of £372,000. Previous to the coming of the motor omnibus the average expenditure was 6.16d. per yard per annum, and it had increased to 12.85d. The damage caused to Middlesex roads by motor traffic had already run into hundreds of thousands of pounds.

North Eastern Railway.—Among the proposals of this Bill, which was heard by the Earl of Camperdown's Committee of the House of Lords on April 30 and May 1, was a scheme to run railless trolley cars over the High Level Bridge over the Tyne, and connecting Newcastle with Gateshead. The company obtained power in 1905 to run motor omnibuses, but they were now advised that the trolley vehicles were more suitable. The length of the proposed route was just a quarter of a mile. At present foot passengers had to pay a halfpenny to cross, and one-horsed vehicles fourpence. Some ingenious people had started a service of omnibuses which took passengers over for a halfpenny, and the company, instead of getting 40 halfpence, only got fourpence. Gateshead Tramways Company objected to the proposals on the ground of competition, and Newcastle Corporation opposed on the ground that they were the tramway authority for Newcastle and would be injuriously affected. The Corporation contended that they had powers to lay lines over the bridge. Mr. C. A. Harrison, chief and consulting engineer of the company, said that since the bridge was built in 1849 there been a load limit of seven tons. It was one of the finest bridges in the country, but he could not see how it could be strengthened without being re-constructed. It was not wide enough for other traffic to pass two cars.—Mr. Harry Webber, electrical engineer of the borough of Keighley, who has had experience of trackless trolley cars, gave evidence that the proposals of the company were the most suitable for the bridge.—On May 1, Alderman Rogers, chairman of Newcastle Tramways Committee, Mr. Ernest Hatton, engineer and manager of Newcastle Corporation tramways, and Mr. J. B. Hamilton, manager of Leeds Corporation tramways, gave evidence against the proposal. Alderman Rogers said attempts had been made to negotiate with the company in order to get powers to carry a tramway over the bridge, and till the previous day there had been no opposition to them doing so, except that the engineer had reported against the stability of the bridge. Mr. Hatton said his proposal was that the company should allow tramways to be carried over the bridge, and receive a halfpenny for every passenger carried, less the costs of working. They had no desire to make money out of the company, but the offer was not accepted. Counsel offered evidence of Sir Maurice Fitzmaurice to the effect that there would be no difficulty in making the bridge capable of carrying the tramway without detracting from its appearance. The chairman said the committee would dispense with Sir Maurice's evidence. Subsequently they rejected the clause.

Norwich Tramways Company.—This Bill, mainly for the construction of new tramways and works at an outlay of £35,398, was before the House of Commons' Committee on Unopposed Measures on April 20, when Mr. Moon, the Speaker's counsel, stated that there were no precedents for the clause asking for powers to deal with obstructions on the tramway lines. Mr. J. Kennedy (for the company) produced several precedents, and Mr. J. E. Winslow, engineer to the company, testified to eight cases of obstruction last year. The company wished to have the protection of the following clause :—

If any person wilfully does or causes to be done with respect to any apparatus used for or in connexion with the working of any of the tramways anything which is calculated to obstruct or interfere with the working of such tramway or to cause injury to any person, he shall (without prejudice to any proceedings by way of indictment or otherwise to which he may be subjected) be guilty of an offence punishable on summary conviction, and every person convicted of such offence or of any offence under Section 50 of the Tramways Act of 1870, with respect to any such tramway, shall be liable to a penalty not exceeding £20. The company may remove all obstructions caused by any breakdown or illegal act.

The Committee, over which Mr. J. H. Whitley, the chairman of the Ways and Means Committee presided, accepted the clause and sent the Bill to the House of Commons for third reading.

Walsall Corporation.—A House of Commons Committee, on April 30, began the consideration of this Bill which, Mr. Fitzgerald said, asked for authority to construct a trolley vehicle route in Cannock, a large colliery neighbourhood. Route No. 3 ran along the Birmingham Road to the junction with Newton Road, and was of great use to summer and holiday traffic. Route No. 4 was intended to make a connection with West Bromwich. West Bromwich last year obtained power to run trolley cars and motors up to their borough boundary. There would be a complete trolley route from Walsall to the centre of West Bromwich. In Clause 29 it was proposed to enable the Board of Trade, with the consent of the road authorities, to make a provisional order for the use of trolley vehicles on any road outside the borough. Clause 23 gave the Corporation the power to provide and run motor omnibuses along the trolley road and any other route outside the borough. The Bill was opposed by Staffordshire County Council and Brownhills and Cannock Urban Councils, who asked for contributions for the maintenance of the roads under their control. Counsel said that motor omnibuses belonging to companies carried 200,000,000 passengers last year and made no contribution to the upkeep of the roads. Amongst the witnesses examined was Alderman Cope, chairman of the Tramways Committee, who declined to admit that the Corporation should make a contribution to the County Council for road maintenance, or that such a contribution was a condition of the sanction given by urban district councils.—On May 5 Mr. J. B. Hamilton (Leeds) and Mr. C. J. Spencer (Bradford) gave evidence against compelling trolley vehicles to contribute when motor omnibuses, which were already using the roads, paid nothing. The hearing concluded on May 7, when the Committee directed that the Corporation should pay £4,000 to the County Council apart from street widening, if required by the trolley system, and three-eighths of a penny per car mile. Motor omnibuses would be exempt from either charge.

L.C.C. TRAMWAY MATTERS.

The London County Council resumed their weekly meetings on Tuesday, after the Easter recess, when the Highways Committee presented reports covering numerous details of the work of the tramways department.

CONSTRUCTION WORK.

Reference was made to the reconstruction on the conduit system of two lengths of horse tramways, one in Woolwich and the other in North London, which were opened for public traffic in April. A double line junction leading from Mitcham Road into Tooting High Street is now under construction. The completion of this work will enable a direct service of cars to be provided between Merton and the shopping centres of Streatham and Brixton.

EXTENSION OF THE USE OF TRAIL CARS.

It was reported that the Board of Trade had agreed to the running of trail cars on nine routes, covering practically the whole of the tramways south of the river. The trail cars may now be run at all times, with the exception of Sundays, Bank holidays, and public holidays between 12.30 a.m. and 10 a.m., and Mondays,

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Tuesdays, Wednesdays, Thursdays, and Fridays between 10 a.m. and 4 p.m.

RUNNING OF BEXLEY CARS.

The arrangements made some time ago with the Bexley Urban District Council give the Council running powers until 1922 over the London County Council's tramways from Wickham Lane to Beresford Square, Woolwich. The District Council had, from July 26, 1908, to December 31, 1910, paid the sum of 6d. for every car mile run by their cars over the London lines, while the sum of 6½d. per car mile was paid to July 25, 1913. The Highways Committee and the District Council have now agreed that the District Council should pay 6½d. a car mile from July 26, 1913, to March 31, 1914, and after that date, 6d. a car mile to July 25, 1918.

BREAKDOWN LORRY DRIVERS.

The Highways Committee recommended that the pay of the men employed in the breakdown gangs in the tramways department should be fixed at from 35s. to 40s. a week, and that the average hours of labour should be 56 a week, while payment for overtime should be made at the rate of time and a quarter.

PETROL-ELECTRIC CARS

An agreement was entered into some time ago with W. A. Stevens, Limited, for the supply and erection of internal combustion engines for three horse tramway cars. The total cost of this work amounted to £1,651 4s., and the Highways Committee recommended that payment for this amount should be made.

BOILER HOUSE WORKSHOP.

The Highways Committee reported that they had received the following tenders from selected firms for the supply of one 10 horse-power three-phase motor and one 2 horse-power three-phase portable motor required for the boiler house workshop at the Greenwich generating station:—

	£	s.	d.
General Electric Co., Ltd.	100	7	0
Electric Construction Co., Ltd.	106	10	0
,, ,, ,, (alternative)	114	10	0
British Westinghouse Electric and Manufacturing Co., Ltd.	107	12	10
Siemens Bros. Dynamo Works, Ltd	127	4	9

and that they had accepted the tender of the General Electric Company.

All tramway reports were adopted without discussion.

THROUGH RUNNING.

Mr. J. D. Gilbert asked (1) whether negotiations had taken place with the London United Tramways Company in respect of the through running from the Embankment to Kingston and Hampton Court? (2) In view of the great popularity with Londoners of long-distance tramcar rides during the summer months, especially on Saturdays and Sundays, was there any prospect of services from the Embankment to Croydon and Purley, and Bexley Heath and Dartford, being arranged this year?

Mr. G. H. Hume (chairman of the Highways Committee) replied that as to through running facilities to Hampton Court, negotiations were still proceeding. Croydon Corporation would not agree to through running, but he thought Bexley Heath would later on. Through cars were being arranged between Erith and London.

MISCELLANEOUS NEWS AND NOTES.

Newspaper Selling on Cars.—Glasgow Newsagents' Union have resolved to approach the Tramways Committee regarding the competition of newspaper selling on cars.

Jib Crane for Car Depot.—The Highways Committee of the London County Council have invited tenders from selected firms for an electrically operated travelling jib crane for use in the third section of the central car repair depôt.

Newcastle Tramways to Cross the Tyne.—In consequence of the rejection of the North Eastern Railway Company's trolley car scheme for the High Level Bridge, the Tramways Committee have decided to seek power to extend their lines over the bridge.

Track Doubling at Huddersfield.—The Board of Trade have given their consent to the doubling of the lines in New Hey Road, Outlane, and Longwood Road and Vicarage Road, Longwood. One or two proposed extensions are now under consideration.

Bristol Tramways Purchase Question.—The Special Committee of Bristol Corporation have resolved to recommend the authority to accept the Tramways Bill as passed by the Lords' Committee, and to arrange for an early poll of the ratepayers upon the whole question.

Forthcoming Expenditure at Birmingham.—The tramway extensions sanctioned this week by Parliament are estimated to cost £144,200, while electrical equipment will cost £34,710, and rolling stock £18,600. For the purchase of lands and street improvements the estimated outlay is £46,958.

Rotherham Provisional Order.—A Bill was presented in the House of Commons on April 20 by the Parliamentary Secretary of the Board of Trade to confirm a Provisional Order made by the Board under the Tramways Act, 1870, relating to the Rotherham Corporation tramways. The measure was read a first time.

Halifax Extensions and Lines Outside the Borough.—In about seven years' time the Halifax Council's lease of tramways in outside areas will expire, and the Tramways Committee have decided to consider the question of gaining an extension of the period and also of constructing new lines to such places as Rastrick and Elland.

Iron and Steel Institute.—At the annual conference, held on May 7 in London, Sir R. A. Hadfield read a paper entitled "Magnetic and Mechanical Properties of Manganese Steel." Mr. E. Riley, of City Road, London, a director of the North Eastern Steel Company, and of the firm of Messrs. E. Riley and Harbord, was awarded the Bessemer Gold Medal.

Covered Cars for Sunderland.—The Tramways Committee have recommended that top-covers be placed on all the cars with the exception of ten. As for six of the cars of a certain type a covered top would be too heavy for the existing machinery, and the committee propose to provide new trucks and equipment for these cars, the old trucks and equipment to be supplied with ordinary bodies.

London and Erith Through Running.—Erith Council have received a letter from London County Council stating that the cost of joining up the two tramway systems at Abbey Wood would amount to £1,055, of which £375 would meet the cost of the work in the Erith district. Erith Council have deferred consideration of the matter until their engineer has reported on the specification and plan submitted by the County Council.

Bill to Permit Profit-Sharing with Municipal Employees.—As a sequel to the recent surcharging of Belfast Corporation with the money voted to the tramway employees as a share of the profits of the tramway undertaking, Lord R. Cecil (U.) on May 7 asked leave of the House of Commons to introduce a Bill to enable local authorities to share with their employees profits made by such local authorities. The Bill was brought in and read a first time.

The Edison and Swan United Electric Light Company.—Next week this company will open a fine West End showroom, situate at 71, Victoria Street, Westminster, S.W. This step is necessary owing to increased trade, and the showrooms will contain an extensive display of all Ediswan electrical accessories, "Royal Ediswan" drawn wire and carbon lamps, electric heaters, fans, fancy fittings, glassware, suction cleaners, flat irons, cooking utensils, etc

Current Consumption at Blackburn.—Mr. J. H. Cowell, general manager of the Blackburn Corporation tramways, in his report for the year ended March 31, states that the average energy consumption was 1.64 units, the cost being 2.14d. per unit. This represents a saving in the cost of current on the mileage run, compared with last year, of approximately £1,100. He attributes the reduction in consumption of current to the fact that the cars and track have been well maintained. A sum of £452 has been paid in bonuses to the motormen during the year for low current consumption.

Trial of a New Lifeguard at Aberdeen.—The tramways department are giving a trial to a new lifeguard invented by Messrs. Cromarty and Stuart, of Aberdeen. The gate and a swinging scoop are connected by means of springs, so that when the gate is pushed inwards the more firmly the scoop presses on the ground. When the obstacle passes the gate the scoop resumes its original position clear of the ground. If desired the gate can be so adjusted that it will not resume its normal position until released by the driver. The same inventors have devised a guard for road motor vehicles.

Post Office Claim Against Manchester Tramways Department.—A claim was made by the Postmaster-General in the County Court on April 27 against Manchester Tramways Department for damage caused to a pillar-box. Mr. Elliott, for the plaintiff, said the driver of a tramcar in Fairfield Street tried to pass before the trailer of a motor wagon had got clear of the line. The result was that the wagon was driven against the box. Mr. Elliott read a section of the Telegraphs Act to show that in regard to damage done to Post Office property it was not necessary to prove negligence. Judge Mellor said there was no evidence of negligence, without which he could not see how the Post Office could succeed. Judgment would be given for defendants.

Progress at Darwen.—Concurrently with the decision of Darwen Council to purchase two new cars at a cost of £1,500 the first annual report of Mr. F. J. S. Hosken as general manager and engineer of the tramways has been issued, showing a profit of £440, as against £106 the previous year. Passengers showed an increase of 306,228, the average number of journeys per head of the population rising from 72 to 82. In addition to increasing the comfort of the passengers by renovating the cars and by other means, cheap dinner hour and return tickets have been issued. During the present year a bonus is to be given to motormen for the economical use of current. At present about 1.7 units of power per car mile are expended, and drivers who bring the consumption down to 1.3 will receive an extra 2s. weekly.

Morecambe Tramways and Electrification.—In reporting that during the past year the tramways receipts increased by over £1,121, Alderman Brown, the chairman, said he considered they had done very well, in spite of the criticism they had had to contend with in still running horse cars. He questioned whether people came to the seaside to be whirled about in electric cars. On April 28, a special meeting of the Council directed the Tramways Committee to report at an early date on the question of electrification, after obtaining information about all systems. The Committee already possess a report prepared by the late electrical engineer (Mr. L. B. Hogarth) showing the relative cost and estimated profits of four different systems—the conduit, the accumulator, petrol or petrol-electric, and the overhead trolley system.

East Ham Competition Entails a Tramway Rate.—East Ham Council have agreed to a rate of 1½d. in the pound to make up the deficiency of £5,500 in the tramway account for the past year, to which had also to be added a deficit of £1,200 for the preceding year. £3,000 of the shortage will be made good by appropriating the whole of the reserve fund. The chairman of the Finance Committee informed the Council at their last meeting that in past years the tramways had contributed a total of 8d. in relief of rates. Many members had been against the excessive sums devoted to that purpose. The deficit was due to motor omnibus competition, which matter he thought would have to be discussed and dealt with on the lines that commercial undertakings using the main roads and cutting them up should contribute to the cost of such wear.

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Waste Steam for Generating Purposes.—It was reported to West Hartlepool Council on May 5 that the deficiency of £1,878 in the working of the electricity undertaking was due to the expense involved in providing new premises and plant for the utilisation of waste steam from Seaton Carew iron works for generating purposes. Alderman Robson remarked that next year the saving in coal would be greater than the cost of the current which they were supplying to the iron works in return for the waste heat. The deficit is to be met out of the profits in former years. The Mayor (Major Martin) reported that the first year's working of the tramways by the Corporation had resulted in a gross profit of £5,079, leaving a surplus, after payment of interest and redemption charges, of £1,663, or 2.32 per cent. on the capital. This surplus would be carried to reserve.

CONTRACTS AND ORDERS.

Irwell and Eastern Rubber Company, Limited, have received an order from London County Council for lead cable sleeves for tramcar ploughs.

Walter Scott, Limited, of Leeds, have received a contract to supply rails for the extension of the Doncaster Council tramways to Warmsworth, at £8,312.

Messrs. Gillespie and Beales, Amberley House, Norfolk Street, London, have received a contract from West Ham Council for the supply of electric conduits.

Mr. John Taylor, of 7, Strand Street, Liverpool, has received an order for 100 Taylor's patent tubular sand controllers from Blackpool Corporation tramways.

Liverpool Tramways Committee have purchased an electric battery wagon, on the recommendation of the electrical engineer, for the electricity department.

Siemens Brothers' Dynamo Works, Limited, have received an order from London County Council to re-wind the armature of one of their motor generators at Clapton sub-station, which was supplied by the company in 1906.

Halifax Council have placed a contract with the British Thomson-Houston Company, Limited, for 1,000 kw. rotary converter, with transformer and e.h.t. switchgear, at £2,100; and with Babcock and Wilcox, Limited, for water-tube boilers, at £2,400.

Warrington Council have placed contracts with the British Westinghouse Company for a rotary converter at £1,537; with the British Thomson-Houston Company for switchboard panels at £581; and with the General Electric Company for a switchboard extension.

General Electric Company, Limited, have received an order from London County Council, amounting to £217, for the supply of electric lighting material required for the central car repair depôt and Abbey Wood car shed. Other tenderers were the Edison and Swan U.E.L. Company and the Armorduct Manufacturing Company.

John Lang and Sons, Glasgow, have received an order from London County Council for the supply of one 6in. screw-cutting lathe required in connection with the equipment of the boiler house workshop at the Greenwich generating station. The price of the tender was £103 10s. Other tenders were received from H. W. Ward and Company and William Muir and Company.

Hurst, Nelson and Company, Limited.—Exaggerated reports have been circulated in regard to the extent of the destruction caused by the fire which took place at the company's works at Motherwell. The fire was confined almost entirely to the carriage building shops, and temporary arrangements have been made, so that the car and carriage work will be carried on while the buildings destroyed by fire are rebuilt.

Aberdeen Council have accepted the following tenders for the conversion of King Street Barracks into a car shed :—Mason work, David Weir and Son, £1,177; carpenter's work, G. Lyell, jun., £1,369; plumber's work, A. M'Robb, £230; slater's work, C. Maitland and Son, £153; asphalt, Messrs. Rodger and Baxter, £37 15s.; special track work, Edgar Allan and Co., Sheffield, £1,063; iron roofing, Messrs. Brydon and Middleton.

Salford Council have accepted the following tenders :—British Westinghouse Electric and Manufacturing Company, three 1,000 kw. compound wound rotary converters and static transformers, £7,388; Edison and Swan United Electric Light Company, supply and erection of two h.t. distribution switchboards and 12 oil switch cubicles, £343; J. Hopkinson and Co., seven Hopkinson-Ferranti, steel parallel slide valves, £136 10s.; Vaughan and Son, supply and erection of a 10-ton hand-operated overhead travelling crane, £115.

PERSONAL.

Mr. F. F. Bideleux, late chief accountant of the Lacroze Tramway Company, has started as an independent accountant at Calle Reconquista 424.

Mr. C. Garnett, electrical engineer to Darwen Council, has been recommended by the Electricity Committee for an increase of £50 a year in his salary.

Mr. E. Poole, assistant borough electrical engineer at Durban, left for England on April 26, on six months' leave. His address will be Pentowan, Hayle, Cornwall.

Mr. J. F. Macartney, of Malta and Southampton, a director of the Malta Tramways, Limited, and of Macartney, McElroy and Co., left estate of the gross value of £66,028. He bequeathed £1,000 for the poor of Malta.

Sir T. D. Pile, ex-Lord Mayor of Dublin and a director of the London General Omnibus Company, has been adopted as Liberal candidate for the Torquay Division.

Mr. H. A. Howie, deputy electrical city engineer at Sheffield, has been selected for the appointment of borough electrical engineer at Walsall, at a commencing salary of £500 per annum.

Mr. J. B. Sparks has resigned his position with Dr. H. F. Parshall, consulting engineer, to take up the post of chief electrical engineer to the Bergwerke und Hüttenverwaltung (G.m.b H.), Frankfurt-on-Main.

Mr. Darwood, a member of the firm in Rangoon who act as local agents to the Rangoon Electric Tramway and Supply Company, is on a visit to England. He attended the annual meeting of the shareholders on May 6 at the company's offices, 3, Great Winchester Street, E.C.

Mr. J. W. Horton, of Walsall, has been selected by York Tramways Committee for appointment as traffic superintendent at the commencing salary of £156, rising at the end of the first year by £4, and thereafter by annual increments of £5 to the maximum salary of £175.

Mr. F. de Witt, a draughtsman in the tramways department of the London County Council, is a lieutenant in the Royal Field Artillery of the Territorial Force, and recently underwent an obligatory course of instruction lasting 24 days. The Council have decided to pay his salary for that period.

Mr. R. O. Parker, formerly of the Great Western Railway general manager's office, has been appointed traffic manager of the Asuncion Tramway Light and Power Company at Asuncion. He was connected with the Great Western Railway for five years, and subsequently with the Entre Rios Railway for two years.

Mr. H. Holliday has been presented with a framed photographic group of the officers and employees of Torquay Tramways Company on his departure to take up the appointment of manager and engineer of the Rhondda Tramways Company. The presentation was made by the Rev. L. Bevan at St. Anne's Institute.

Mr. J. A. Robertson, who has resigned the post of borough electrical engineer at Greenock to take a similar position at Salford, has been appointed consulting engineer to Greenock until the extension of the undertaking to Port Glasgow. He has also been asked to advise the Corporation in appointing a successor.

Increases of Salaries at Liverpool.—The Tramways Committee have recommended the following increases :—Mr. T. Ridyard, rolling stock superintendent, from £350 to £400 per annum; Mr. T. Blaney, mechanical and electrical engineer, from £230 to £250; Mr. R. Roulston, depôt inspector, from £220 to £230.

Rhondda Company Presentations.—On behalf of the staff and employees of Rhondda Tramways Company, Mr. G. Rodey, the traffic manager, has presented a silver rose bowl to Mr. H. J. Nisbett, general manager and engineer, on his departure for Torquay, and a walking stick, case of brushes, and a pocket wallet containing a cheque to Mr. R. G. Rees, overhead superintendent, on his departure for Bolton.

Mr. Valentine Brown, general manager of La Plata Electric Tramways Company, is expected on a visit to London during the coming summer. At the annual meeting of the company Mr. W. F. Hamilton, K.C., the chairman, stated that under Mr. Brown's able management the cost of current in 1913 worked out at 2.02d. per car mile run, notwithstanding the increased cost of coal, as compared with 2.19d. in 1912, and he had succeeded in training the motormen to reduce the consumption of current by judicious handling and running of the cars.

Directorate of the Anglo-Argentine Tramways.—In proposing the re-election of three gentlemen to fill the places of directors who had passed away, Mr. J. B. Concanon (chairman) at the annual meeting, mentioned that the first, Mr. Leon Cassel, was a partner in an important banking firm in Brussels, and he represented a large shareholding there. Mr. W. F. Hamilton, K.C., had been associated with him (the chairman) for 14 years in the direction of tramways in various parts of the world, and he was recognised in the City of London as being one of the best experts in Argentine law in this country. Mr. G. A. Touche was the head of an eminent firm of accountants, and a gentleman of his knowledge and professional experience was of the greatest advantage in dealing with the enormous mass of figures they had to deal with. Mr. Touche also had the advantage of having been connected with tramways for many years, and he was chairman of the Monte Video Tramways Company.

Leeds Appointments.—On May 6 the City Council adopted the General Purposes Committee's recommendations for transferring certain work of the Highways Committee to the Tramways and Electricity Committee, and the duties of the Sub-Sanitary (Cleansing) Committee to the Highways Committee, which in future is to be called the Cleansing Committee. The following appointments were agreed to :—Mr. R. B. Holt, tramways permanent way engineer, to also take charge (under the commercial manager) of the highways department, at a salary of £400 per annum, with Mr. J. Buckley as general outside superintendent, at a salary of £250 per annum, and Mr. E. W. Cockerlyne as surveying assistant at £215 per annum; the commercial manager to be superintendent of cleansing, and Mr. H. Smith, an assistant in the tramways department, to be principal assistant under him at £200 per annum.

Mr. George Conaty, consulting engineer of Birmingham, has died at a sanatorium in Berkshire. Until six years ago he was manager of the Birmingham Tramways Company, which then operated 105 route miles in the city and district.

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FINANCIAL REPORTS AND MEETINGS.

La Plata Electric Tramways Company.—A dividend of 3 per cent. on the preference shares has been paid, thus bringing arrears up to August 31, 1912. £1,000 has been placed to reserve, and £330 carried forward.

Taunton Electric Traction Company.—Mr. G. J. Somerville, who presided at the annual meeting held at the London office, reported that the total receipts for 1913 were £2,776, and that a balance of £30 remained to be carried forward after meeting all expenses, debenture interest, and providing £100 for renewals.

Worcester Electric Traction Company.—The report states that the revenue for 1913 amounted to £18,070, as compared with £15,771. After meeting expenses chargeable to revenue and providing £2,130 for renewals there remains a net balance of £4,530. To reserve £1,000 is placed, and a dividend is to be paid on ordinary shares at the rate of 3½ per cent. for the year, carrying forward £200. The net revenue increased £1,033, due chiefly to the fine summer and to additional motor omnibus services.

Hastings and District Electric Tramways Company.—At the annual meeting on May 5 the directors' report recommended a final dividend at the rate of 6 per cent. per annum on the preference shares, making 6 per cent. for the year; placing £2,000 to depreciation account, making that fund £25,000, writing £1,000 off suspense account, and carrying £1,037 forward. The chairman (Mr. G. Kitchen) stated that the Tilling-Stevens petrol-electric cars had been installed on the sea front in place of the Dolter system. They now had six cars in service, and a further eleven were under order. The new cars were running satisfactorily. During the year there had been an increase in the receipts amounting to £3,638, principally due to the fine summer, but the increase had involved extra expenditure, as they had run 67,000 more car miles.

Swansea Improvements and Tramways Company.—Mr. C. G. Tegetmeier, presiding at the annual meeting on May 4, said the number of passengers carried last year was 12,008,000, an increase of 1,180,000. The exceptional progress made during the last few years was not due to any extension of the system. He attributed the great increases since 1907 to the growth of the prosperity of Swansea, which the company had no doubt facilitated. The dividends had increased during the period from 2½ per cent. to 6 per cent. The report was adopted, the available balance of £16,584 being allocated as follows:—To the reserve fund, £4,000; dividend on preference shares at 6 per cent., £500; dividend on preference shares at 5 per cent., £2,008; dividend on ordinary shares at 6 per cent., in respect of which an interim dividend at the rate of 5 per cent. for the half-year was paid in October, £7,800; carried forward, £2,185.

Carthagena and Herrerias Steam Tramways Company.—The report for 1913 shows a working profit of £12,607. Deducting debenture interest, £6,000, including interest, £4,600, and amount set aside for their redemption, £1,400, and adding the balance brought forward of £2,402, there is a balance to the credit of new revenue of £9,100. The directors have applied £1,000 to renewal account, and they recommend the payment of a dividend at the rate of 2 per cent., or 4s. per share, leaving £5,100 to be carried forward. The gross receipts show an increase of £5,353, and the working expenses an increase of £1,351. The board allude, with regret, to the resignation of Mr. R. J. Fennessy, their secretary, owing to failing health, and they have granted him a retiring allowance of £200 a year. Mr. F. E. Pillar, who has been for twenty-five years in the company's service, and for the past eleven years has held the post of accountant, has been appointed secretary.

Sunderland District Electric Tramways.—Mr. H. R. Hogg, who presided at the annual meeting on May 5, said the accounts presented were those for the first year since the directors had had the system in their own hands from the receiver. They had received delivery during the year of 16 new cars, and that had enabled their manager to do away with the last of the old French cars, which for a long time had given trouble. The net earnings showed an increase of some £3,000 over the previous twelve months. As no depreciation had been written off for some years, the board had thought it right to put aside a substantial sum for that purpose. Land had been purchased on which to build cottages for those of the employees who still found a difficulty in providing for themselves. The most cheering point in the future of the company was the growth of the population all along the line. The mining villages had extended to considerable distances, and were taking on the aspect of small towns.

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ABCHURCH YARD, CANNON STREET,
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Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

WEEKLY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended May 2, give total receipts of £236,346 or £13,404 more than in the corresponding week last year. The total length of track was 2,803 miles, or 24 more than for the corresponding week. Receipts were at the rate of £82 11s. per track mile, an increase of £4 1s. 1d. as compared with the corresponding week of last year.

THE BRITISH ELECTRICAL FEDERATION.

The traffic statement for the week ended May 1, 1914, shows that the receipts from tramways and railways amounted to £41,073, as compared with £38,328 in the corresponding week last year, and from omnibuses £15,022, as compared with £5,144, making a total of £56,095, as compared with £43,472. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year the receipts show an increase of £3,233 upon the week.

RAILWAYS OF THE UNITED KINGDOM.

The summary of the official traffic returns of the fifty principal railways of the United Kingdom for the week ended May 3 gives a total of £2,327,251, which was earned on 22,161 miles, being at the rate of £105 0s. 3d. per mile of line open. For the corresponding week of 1913 the receipts of the same lines amounted to £2,316,020, with 22,100 miles open, or £104 16s. 9d. per mile. There was thus an increase of £10,331 in receipts, an increase of 62 in mileage, and an increase of 3s. 6d. in receipts per mile. Thirty-six of the returns distinguish between the receipts from passenger and goods traffic, and these show an increase of £38,000 (or £1 13s. 5d. per mile) in the passenger receipts, and a decrease of £30,466 (or £1 11s. 5d. per mile) in the receipts from goods traffic. The aggregate receipts of the fifty railways since the beginning of the year amounted to £38,811,565, in comparison with £39,137,807 last year, a decrease of £326,242.

COPPER AND ALUMINIUM MARKET.

May 8, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton:—

	Friday, May 8.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	63 0 0 ..	64 0 0 ..	69 15 0
.. .. (three months)	63 7 6 ..	64 5 0 ..	69 12 6
Electrolytic Copper—bars or ingots	65 10 0 ..	66 0 0 ..	72 15 0
Aluminium—bars or ingots	83 0 0 ..	83 0 0 ..	93 0 0

COAL MARKET.

May 8, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows:—

	Friday, May 8.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	s. d.
Best Admiralty Welsh (large)	24 3 ..	24 3 ..	27 6 ..	24 9
Best Seconds..	23 6 ..	23 6 ..	27 0 ..	23 3
Ordinary Drys	20 9 ..	20 9 ..	25 0 ..	22 3
Best Washed Nuts	20 6 ..	20 6 ..	22 0 ..	..
Best Washed Peas	19 6 ..	19 6 ..	20 6 ..	..
Cardiff, f.o.b.—				
Best Admiralty (large) ..	19 9 ..	19 9 ..	23 0 ..	19 9
Best Seconds	19 0 ..	19 0 ..	22 6 ..	18 3
Ordinary Drys	16 3 ..	16 3 ..	20 6 ..	17 3
Best Washed Nuts	16 0 ..	16 0 ..	17 6 ..	..
Best Washed Peas	15 0 ..	15 0 ..	16 0 ..	..
Newcastle, f.o.b.—				
Best Steams..	14 6 ..	14 6 ..	17 0 ..	14 9
Best Seconds	12 6 ..	12 6 ..	14 9 ..	13 3
Smalls	8 6 ..	8 3 ..	12 3 ..	9 9

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregate. Wks.	Aggregate. 1913-4.	Increase or Dec.
Anglo-Argentine	April 22	£57,457	£54,870	16	£909,619	+ £18,136
Auckland..... (28 days	April	20,216	21,702	41	204,128	+ 4,813
Ballarat and Bendigo	March	3 904	4,151	50	47,694	— 701
Brazilian St. Rly. Mlrs	March	46,496	51,582	34	423,040	+ 65,379
Brazilian Traction.....	May 2	88,084	90,000	18	1,699,869	+ 76,185
Brisbane	April	25,390	28,610	17	110,525	+ 11,095
British Columbia ..... $	March	720,493	717,281	39	6,732,082	+ 349,161
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacroze .	April	44,215	43,411	43	445,536	+ 6,311
Calcutta..... Rs	May 2	62,382	65,680	17	12,17,436	+ 55,724
Cape Town	March	13,197	13,992	13	41,980	+ 2,693
Carthagena & Herreria	April	3,050	2,069	17	10,189	— 2,933
Cordoba	March	12,668	13,489	52	159,207	+ 13,593
East India	April	1,760	1,837	39	17,289	+ 717
Kalgoorlie.....	March	2,862	2,476	13	6,985	— 1,255
La Plata.....	April	5,307	4,716	17	19,956	— 1,689
Lima.....	Feb.	32,206	33,880	9	71,758	+ 5,423
Lisbon ..... Mlrs.	Jan.	...	156,175	4	156 175	...
Madras (14 days) Rs.	April 30	27,549	30,297	17	233,027	+ 20,807
Melbourne	Feb.	62,500	64,000	9	132 500	+ 3,000
Mexico ..... $	March	606,411	617,654	13	1,750,819	+ 253,412
Montevideo	April	30,087	29,645	26	210,176	+ 414
Para	May 3	4,030	3,581	22	76,383	— 14,561
Port Elizabeth.....	March	3,943	4,535	13	12,875	+ 844
Puebla ..... $	March	62,500	67,300	13	185,400	+ 23,800
Rangoon Tramways..	April	5,351	5,267	17	22,014	+ 675
Shanghai .....$	April 29	18,736	24,800	17	409,460	+ 69,289
Singapore .....$	May 2	11,580	11,485	17	214,985	+ 9,470
Toronto .....$	March	772,491	886,328	13	2,461,956	+ 114,224
Winnipeg.....$	March	329,016	347,812	13	1,081,461	+

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1913-4.	Increase or Dec.
Aberdeen Corporation..	April 29	£1,434	£1,596	+ £162	48	£76 495	+ £4,698
Accrington Corp.....	,, 29	569	580	+ 11	4	2,569	+ 269
Ayr Corporation	May 2	238	804	+ 46	50	17,798	+ 2,614
Bath Electric	April 27	839	1,005	+ 166	17	13,518	+ 1,021
Birkenhead Corp.	May 3	1,412	1,443	+ 31	4½	6,234	+ 819
Birmingham Corp.	,, 2	11,353	12,433	+ 1,035	5	59,143	+ 4,735
Blackburn Corporation	April 29	1,186	1,319	+ 133	5	7,273	+ 1,340
Blackpool Corporation	,, 30	971	1,125	+ 154	3½	7,081	+ 3,788
Bolton Corporation	May 3	2,600	2,818	+ 218	5	14,240	+ 1,520
Bournemouth Corp.....	,, 6	1,767	1,845	+ 78	5	11,208	+ 1,740
Bradford Corporation..	,, 2	5,771	6,3?2	+ 597	5	30,887	+ 4,283
Brighton Corporation..	,, 3	912	996	+ 84	5	5,248	+ 995
Bristol	,, 1	7,210	8,539	+ 1,329	17½	135,266	+ 13,069
British Elec. Federatn	,, 1	43,472	56,095	*	...	...	...
Burnley Corporation ..	,, 2	1,600	1,838	+ 238	5	8,957	+ 838
Burton-on-Trent Corp.	,, 3	295	286	— 9	5	1,434	+ 87
Bury Corporation.....	,, 3	1,350	1,364	+ 14	5	7,013	+ 699
Cardiff Corporation.....	April 25	2,593	2,795	+ 202	3	10,655	+ 1,109
Chatham and District..	,, 30	883	918	+ 35	17	14,826	+ 425
Chesterfield Corp.	,, 30	210	386	+ 146	4	1,312	+ 272
Colne Corporation	May 2	260	296	+ 36	...	...	...
Cork Electric.....	April 30	491	544	+ 53	17	7,970	+ 176
Croydon Corporation ..	,, 24	1,682	1,781	+ 99	3	6,602	+ 1,147
Darlington Corporatior	May 2	251	244	— 7	5	1,303	+ 142
Derby Corporation	,, 2	951	1,049	+ 98	4½	4,963	+ 595
Dover Corporation	,, 2	213	233	+ 20	5	1 161	+ 168
Dublin & Lucan	,, 1	136	151	+ 15	17	2,132	— 31
Dublin United	,, 1	5,862	5,976	+ 114	18	93,683	— 2 586
Dundee City	April 29	1,223	1,330	+ 107	50	65,097	+ 4,299
East Ham Corporation	May 2	1,120	1,023	+ 3	4½	4 937	+ 24
Exeter Corporation	,, 1	314	351	+ 37	5	1,677	+ 276
Gearless Motor 'Buses.	,, 2	...	510	...	18	8.148	...
Glasgow Corporation ..	,, 2	20,082	21,600	+ 1,518	48	988,220	+ 67,535
Glossop(U.Elec.Supply)	,, 2	133	126	— 7	18	2,106	— 17
Halifax Corporation ...	April 24	1,904	2,114	+ 210	4	9,419	+ 1,693
Hastings & District.....	,, 29	940	994	+ 54	17	13,738	+ 258
Huddersfield Corp.	May 2	2,062	2,199	+ 137	5	11,314	+ 1,685
Hull Corporation	,, 2	3,048	3,069	+ 21	5	14,942	+ 484
Ilford U.D.C.	,, 2	459	489	+ 30	4	2,425	+ 417
Ilkeston Corporation ..	,, 6	128	126	— 2	6	799	+ 73
Ipswich Corporation ..	,, 2	417	414	— 3	5	2,111	+ 328
Isle of Thanet	,, 2	450	463	+ 13	31	11,443	+ 1,080
Kilmarnock Corp.	,, 2	164	165	+ 1	50	8,727	+ 519
Lanarkshire	April 30	1,623	1,943	+ 320	17	32,057	+ 4,442
Lancashire United	,, 29	1.429	1,683	+ 254	17	27,282	+ 3,651
Leeds City	May 2	8,130	8,406	+ 276	5	40,522	+ 4,980
Leicester Corporation..	,, 2	2,823	2,902	+ 79	18	49,976	+ 8,225
Leith Corporation	,, 2	650	715	+ 65	50	35,429	+ 1,834
Leyton U.D.C.	April 2	324	342	+ 18	½	342	+ 18
Liverpool Corporation..	May 2	13.644	13,021	+ 377	17½	224,916	+ 12,436
Llandudno & Colwyn B.	,, 1	226	239	+ 13	22	4.047	+ 104
London County Council	April 29	42,307	44,148	+ 1,841	4	184,889	+ 11,979
London Gnl. Omnibus..	May 2	63,117	67,498	+ 4,381	18	1,043,241	+ 35,093
London United	,, 1	5,901	6,541	+ 640	18	101,124	+ 5,516
Lowestoft Corporatior	,, 2	149	169	+ 20	30	5,544	+ 747
Maidstone Corporation	April 30	184	203	+ 19	5	1,067	+ 198
Manchester Corp.....	May 2	17.031	17,935	+ 844	5	84,287	+ 6.421
Met. Elec. Trys.	,, 1	9.016	9.627	+ 611	18	154.169	+ 4,989
Nat. Steam Car Co., Ld.	April 30	3,497	6,515	+ 3,018	26	101.052	+ 45.089
Nelson Corporation.....	May 2	190	217	+ 27	4½	1,048	+ 86
N'castle-on-Tyne Corp.	,, 2	4,677	5,023	+ 326	5	24,513	+ 2,916
Newport (Mon.) Corp...	,, 2	702	774	+ 72	5	3,962	+ 478
New St. Helens & Dist..	April 29	737	779	+ 42	44	35.609	+ 3,227
Northampton Corp	May 1	542	569	+ 27	4½	2.669	+ 270
Nottingham Corp.	April 30	3,265	3,327	+ 62	4½	15.071	+ 862
Oldham Corporation ..	May 3	2,134	2,235	+ 101	6	13,548	+ 1,422
Portsmouth Corp.....	,, 2	1,609	2,158	+ 249	5	11,357	...
Preston Corporation ..	April 29	853	860	+ 7	5	4,432	+ 322
Provincial	May 2	1,688	1,883	+ 195	30	63,836	+ 3,662
Reading Corporation ..	April 30	655	699	+ 44	4	3,154	+ 430
Rhondda.....	,, 30	1,157	1,197	+ 40	17	20.903	+ 1,152
Rochdale Corporation	May 2	1,528	1,602	+ 74	5	8,084	+ 945
Rotherham Corp.....	,, 6	932	939	+ 7	5	4,924	+ 295
Salford Corporation ..	,, 4	5,005	4,992	— 13	5	25.402	+ 1.547
Sheffield Corporation..	,, 3	7,359	7,457	+ 98	5½	42,887	+ 2,732
Southampton Corp.....	April 29	1,207	1,303	+ 96	4	5,604	+ 540
Southend-on-Sea Corp	,, 29	720	903	+ 183	5	4.238	+ 1,418
South Met. Trys.	May 1	803	1,226	+ 423	18	18,323	+ 5,418
South Shields Corp.....	,, 2	676	722	+ 46	4½	3,591	+ 729
Sunderland Corp.....	,, 3	1,401	1,366	— 35	5	6,868	+ 525
Sunderland District ...	April 27	576	594	+ 18	23	14.970	+ 1,445
Swindon Corporation ..	,, 29	158	169	+ 11	4	769	+ 144
Torquay.....	,, 30	463	577	+ 114	17	8 174	+ 507
Trys. (M.E.T.) 'Buses	May 2	2 935	9,835	+ 6,900	18	150.429	...
TynesideTrys.&Tmrds	April 29	457	525	+ 68	17	8,867	+ 630
Wallasey Corporation	May 2	1,170	1,223	+ 53	4½	5 976	+ 763
Walsall Corporation ...	,, 2	625	607	— 18	18	10,982	+ 844
Walthamstow U.D.C....	,, 2	697	803	+ 106	5	3,996	+ 928
Warrington Corp	April 23	438	431	— 7	3	1,486	+ 64
West Ham Corporation	,, 30	2,791	2 832	+ 41	4	12,731	+ 1 213
Wigan Corporation	,, 30	1,433	1,428	— 5	4	6,689	+ 556
Wolverhampton Corp	May 6	1,050	1,019	— 31	6	5,747	+ 565
Yorkshire (W. Riding)	,, 3	1,664	1.361	— 303	18	25,693	+ 1,260

* From such of the services as were working both last year and this year the receipts show an increase of £3,233 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London.....	May 2	£5,147	£4,891	— £256	18	£91,175	— £4,341
City and South London	,, 2	2,743	2.557	— 186	18	49.916	— 3,886
Liverpool Overhead.....	,, 3	1,677	1,719	+ 42	18	29,840	+ 1,094
London Electric.....	,, 2	14,170	13,835	— 335	18	260.420	+ 305
Mersey	,, 2	2,161	2.180	+ 19	18	40.632	+ 152
Metropolitan	,, 3	16.506	17,912	+ 1,404	18	321,964	+ 28,391
Metropolitan District...	,, 2	12.949	12,865	— 84	18	237.068	+ 424

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AMBERLEY HOUSE,
NORFOLK ST., W.C.

TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, May 8.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	69½ — 71½
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	...	4⅝ — 4⅞
5	Do. 5½% Cum. 2nd Pref.	— ½	4⅜ — 4⅝
100	Do. 4% Deb. Stk. Red.....	...	92½ — 94½
100	Do. 4½% Deb. Stk. Red.....	...	98¼ — 101½
100	Do. 5% Deb. Stk. Red.....	...	96½ — 98½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 — 106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅛ — ⅜
1	Do. 5% Cum. Pref	...	½ — ¾
100	Do. 4½% 1st. Mort. Deb. Stock, Red.....	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	...	85 — 87
10	Blackpool and Fleetwood Tramroad Co.	...	14 — 15
	Bombay Elec. Supply and Trams. Co., Ord.	...	14 — 15
10	Do. do. 6% Cum. Pref.....	...	10¾ — 11½
100	Do. do. 4½% Db. Stk. Rd.	...	94½ — 96½
$100	Brazilian Traction Light and Power Co. Lim.....	— 1 ½	77 — 79 xd
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	...	7½ — 8
5	Do. do. 5% Cum. Pref	...	4⅞ — 5⅜
100	Do. do. 4½% 1st Deb Stock, Red. ...	...	98 —101
10	Bristol Tramways and Carriage Co.	...	6¾ — 7
10	Do. do. 4% Cum. Pref.	...	6⅞ — 7⅛
100	Do. do. 4% Deb. Stock	...	100 —102
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	— 1	111 —115
100	Do. Pref. Ord. Stock	...	104 —108
100	Do. 5% Cum. Perpetual Pref. Stock.....	...	102 —105
100	Do. 4½% 1st Mort. Debs.	...	96 — 99
40	Do. 4½% Vancouver Power Debs.	...	94 — 98
100	Do. 4½% Perpetual Cons. Deb Stk.	...	93½ — 95½
100	British Elec. Traction Co., Lim., 6% Cum. Pref.....	...	88 — 91
100	Do. 7% Non-Cum. Pref.	...	56 — 59
10	Do. 6% Pref. Ord. Non-Cum.	— ½	15 — 17
100	Do. Deferred Ord. Stock	— ½	6 — 8
100	Do. 5% Perpetual Debenture Stock.....	— 1	92 — 94
100	Do. 4½% Second Debenture Stock, Rec	...	77 — 80
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	73 — 78
100	Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb.	...	99½ —101½
5	Calcutta Tramways Co., Limited, Ord.	...	6⅞ — 7⅜ xd
5	Do do. 5% Cum. Pref.	...	5 — 5⅛
100	Do. do. 4½% 1st Deb. Stock, Red.	...	97 —100
1	Cape Electric Tramways, Ld., ...	...	⅜ — ¾
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	3 — 3¼
100	Do. 5% Debs., Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co (1904), Lim.	...	5¼ — 5½
100	Do. 4% Debenture Stock Red, 1985	...	91 — 96
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.	+ 1	88 — 92 xd
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	+ 4	89 — 93
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	— 6⅞
10	Dublin United Trams. Co. (1896) Lim. Ord.	+ ⅛	— 11
10	Do. do. 6% Pref.	+ ⅛	— 12½
100	Do. do. "A" Red.	...	— 80¼
100	Do. do. Deb. Stock "B" Red. ..	...	— 80 xd
10	Gateshead & Dist Trys. Co., Ord.	...	8½ — 9
10/-	Hastings & Dist. Electric Trams. Co., Ld., Ord.	...	⅜ — ⅝
1	Do. do. 6% Cum Pref.	...	½ — ¾
100	Do. do 4½% Deb. Stk. Red.	...	65 — 70
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	93½ — 97½
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.).....	...	86 — 90
10	Imperial Tramways, Ord.	...	3 — 3½
10	Do. do. 6% Cum. Pref.....	...	6¼ — 6½
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet E'ec. Trams. & Ltg. Co., 5% Cum. Pref....	...	2 — 2½
100	Do. 4% Debenture Stock	...	73 — 78
1	Kalgoorlie Elec. Trams., Ltd.	...	...
100	Do. do. 5% "A" Deb. Stk.	...	84 — 89
100	Do. do. 6% "B" do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.....	...	⅜ — ⅝
10	Lanarkshire Tramways Co.	...	9¾ — 10¾
100	Lancashire United Tramways. 5% Prior Lien Deb.	...	87 — 89
1	Lisbon Electric Trams., Lim., Ord.....	...	1⅛ — 1¾
1	Do. 6% Cum Pref.....	...	⅛ — ⅜
100	Do. 5% Mort. Debs.	...	95 —100
1	London and Suburban Trac. Co., Lim., Ord.....	...	⅜ — ⅝
100	London General Omnibus Company, Limited.4½% Deb.	...	98½ —100½
100	Do. Do 5% Cum. Inc. Deb. Stk. Red.	...	89 — 93
100	London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red	...	56 — 60
100	Madras Electric Trams. (1904), Lim., 6% Cum. Pref	...	4⅞ — 5¼
5	Do. do. 5% Deb. Stk., Red.	...	101 —103
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	78 — 81
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	...	103 —106
$1,000	Do. do. 5% Bds.	...	98½ —100½
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	⅛ — ⅜
100	Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red. ..	— 1	87 — 90
100	Do. 5% Deb. Stock, Red. ..	...	85½ — 88½
100	Mexico Tramways Co., Common Stock	— 2½	63 — 65
500	Do. Gen. Con. 1st Mort. Gld. Bonds	...	76 — 87
100	Do. 6% 50-yr. Mort. Bonds	+ 1	72 — 73
...	Michigan United Railways 5% 1st Mort. Gld. Bonds ...	— 1½	90 — 90
100	Montreal Street ailway, Sterling 4½% Debs. (1923).....	...	98 —100
100	Do. 4½% Sterling Debs, (1923) ..	— 2	97 — 9
1	National Steam Car Co. Ltd.	— ⅛	⅜ — ⅝
10	Oldham—Ashton and Hyde Elec. Ord.	...	6 — 6½
10	Do. do. 5% Cum. Pref.	...	5¼ — 6½
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	3¾ — 4¼
5	Do. do. 6% Cum. Pref.	...	4 — 4½
1	Perth (W.A.) Elec. Trams.. Ld., Ord.....	...	—
1	Potteries Electric Traction Co., Ltd., Ord.	— ⅛	⅛ — ⅜
1	Do. 5% Cum. Pref.	...	⅜ — ⅝
100	Do. 4½% Debenture Stock, Red.	...	84 — 87
1	Provincial Tramways, Lim.. Ord.	...	⅛ — ⅜
10	Do. 5% 1st Deb. Stock	+ 6	98 —103 xd
...	Puebla Tramway, Light & Power Co., Prior Lien 5% ..	...	73 — 78
5	Rangoon Elec. Trams. & Supply Co. 6% Cum. Pref.....	...	5 — 6⅛
100	Do. do. 4½% 1st Mt. Db. Stk	...	95 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	87 — 89
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	— 1	94½ — 96½
100	Do. do. 5% 50-yr. Mort. Gold Bonds	— 1	88 — 90
100	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	...	96 —100
$500	Do. 5% 1st Mort. Debs., Red., 1929	...	96 — 99
10	Shanghai Elec. Construction Co.	...	12¾ — 13¾
100	Singapore Elec. Tramways Lim., 5% Debs. Red	...	88 — 93
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ...	...	...
100	Do. do. 4% Deb. Stk.....	...	66 — 70
...	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	95 — 97
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	97 — 99
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	— 1	83 — 84
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	90 — 93
5	United Elec. Tramways of Monte Video, Ord.	...	4½ — 5⅛
5	Do. do. 6% Cum. Pref.	...	4⅞ — 5⅛
100	Do. do. 5% 1st Deb. Stk. Red.	...	92½ — 95½
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	93½ — 96½
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	⅛ — ⅜
5	Do. do. 6% Cum. Pref.....	...	4¼ — 4⅞
100	Do. do. 4½% 1st Deb. Stock. Red.....	...	84 — 87

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

BOROUGH OF DARLINGTON.

ELECTRICITY DEPARTMENT.

The Darlington Corporation are prepared to receive tenders for the supply and erection of the following :—

One Water-tube Boiler.
One Cooling Tower.

Copies of the specifications and conditions may be obtained on application to the borough electrical engineer, Electricity Works, Haughton Road, Darlington, accompanied by a deposit of £1 1s., which will be returned on receipt of a *bonâ-fide* tender.

Sealed tenders, endorsed "Tender for Electrical Plant," to be delivered to the undersigned not later than June 4, 1914.

HY. G. STEAVENSON,
Town Clerk.

Town Clerk's Office, Darlington,
May 9, 1914.

COUNTY BOROUGH OF OLDHAM.

TENDERS FOR TURBINES, BOILERS, ETC.

The Oldham Corporation Electricity Committee invite tenders for the supply, erection, and delivery of :—

1. Two 3,000 kw. High-Pressure Steam Turbines, each coupled direct to an Extra-High-Tension Alternating Current Generator, together with Surface Condenser, Pumps, etc.
2. Water Tube Boilers.
3. Feed Pump.
4. Water Cooling Towers.

Copies of specification, general conditions, etc., can be obtained from the Greenhill Electricity Offices, Oldham, on payment of two guineas, which will be returned on receipt of a *bonâ-fide* tender.

The Committee do not bind themselves to accept the lowest or any tender.

By order, J. H. HALLSWORTH,
Town Clerk.

Town Hall, Oldham,
May 12, 1914.

COUNTY BOROUGH OF STOCKPORT.

SAND DRYING APPARATUS.

The Tramways Committee of the Stockport Corporation are prepared to consider the adoption of a rotary or other type of Sand Drying Apparatus, and invite offers for the supplying of the same.

Full particulars of the type of plant, delivery, etc., to be sent to the undersigned, from whom any information in regard to the plant required may be obtained.

R. LOMAX,
Borough and Tramways Electrical Engineer.

Electricity Offices, Millgate, Stockport,
May 12, 1914.

CITY OF LEEDS.

ELECTRIC LIGHTING DEPARTMENT.

Water Tube Boilers, Mechanical Stokers, Economisers, Induced Draught Plants and Inter-connecting Flues.

The Leeds City Council are prepared to receive tenders for six Water Tube Boilers, twelve Mechanical Stokers, six Economisers, three Induced Draught Plants and accessories.

The Council will consider only tenders for the whole of the plant above mentioned.

Copies of the general conditions, specification, and form of tender may be obtained from Mr. C. Nelson Hefford, Manager of the Department, 1, Whitehall Road, Leeds, on payment of a deposit of five pounds, which will be refunded on receipt of a *bonâ-fide* tender.

Tenders must be in the form attached to the specification and must be delivered to me at the Town Hall, Leeds, not later than 11 o'clock in the forenoon on Wednesday, the 10th day of June, 1914, in sealed envelopes, endorsed "Electric Lighting—Tender for Boiler House Plant."

The Corporation do not bind themselves to accept the lowest or any of the tenders sent in.

ROBERT E. FOX,
Town Clerk.

Leeds, May 8, 1914.

COUNTY BOROUGH OF SOUTHAMPTON.

TRAMWAYS DEPARTMENT.

The Corporation invite tenders for the supply and delivery of 200 tons of Steel Tramway Rails, B.S. No. 4 section.

Specification and form of tender can be obtained from Mr. Leonard Johnston, General Manager, 161, Above Bar Street, Southampton.

Sealed tenders, endorsed "Tender for Rails," must be delivered at the Town Clerk's Office by 12 o'clock at noon on Wednesday, the 27th instant.

No pledge is given to accept the lowest or any tender.

R. R. LINTHORNE,
Town Clerk's Office, Town Clerk.
Municipal Offices, Southampton,
May 14, 1914.

SHANGHAI MUNICIPAL COUNCIL.

The Council invite tenders for the supply and delivery f.o.b. British Port of the following :—

High-Tension three-phase Switchgear for one Sub-station.

Specification, with general conditions and form of tender, may be obtained from Messrs. Preece, Cardew, and Snell, 8, Queen Anne's Gate, Westminster, S.W., on payment of a deposit of £1 (one pound) which would be refunded on receipt of a *bonâ-fide* tender. Extra copies of the specification can be obtained on payment of 2s. 6d. each, this amount being non-returnable.

Sealed tenders, in duplicate, endorsed "Shanghai," to be delivered to Messrs. Preece, Cardew, and Snell, 8, Queen Anne's Gate, Westminster, S.W., before 12 o'clock noon on Thursday, May 28, 1914.

The Council do not undertake to accept the lowest or any tender.

CARDIFF CORPORATION.

The Corporation invite tenders for the supply, delivery, and erection of Sundry Steel and Cast Iron Pipe Work and Small Feed Tank.

Specifications, forms of tender, and drawings may be obtained on application to Mr. Arthur Ellis, Electrical Engineer and Manager, Central Offices, the Hayes, on payment of a deposit fee of £1 1s., which will be returned upon receipt of a *bonâ-fide* tender.

Tenders to be endorsed, "Tender for Pipework," and to be delivered at my office on or before 10 a.m. on Thursday, May 28, 1914.

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POSITION VACANT.

COUNTY BOROUGH OF OLDHAM.

WORKS SUPERINTENDENT.

The Tramways Committee invite applications for the position of Works Superintendent of their Tramways. Candidates must have had experience in a large car works, and must also be qualified mechanical and electrical engineers, with a good knowledge of modern workshop practice, including car construction.

Applications, in candidate's own handwriting, stating age, experience, salary, and particulars of present and past employment, with copies of not more than three recent testimonials, endorsed "Works Superintendent," to be addressed to the undersigned and delivered at my Office not later than Wednesday, May 20, 1914.

J. W. Dugdale,
General Manager.

General Manager's Office,
Wallshaw Street, Oldham,
May 12, 1914.

POSITION WANTED.

ENGINEER.

With practical and commercial experience, desires appointment. Several years' experience in Electric Traction work in all details from construction to running. Thoroughly accustomed to management and control of men. Ten years general manager. Highest testimonials. Box 77, The Tramway and Railway World, Amberley House, Norfolk Street, London, W.C.

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THE TRAMWAY & RAILWAY WORLD,
WITH MOTOR TRAFFIC SECTION.
Complete with Title-Page and Index.
VOL. XXXIII., JANUARY—JUNE, 1913
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(Price 10 Shillings each).

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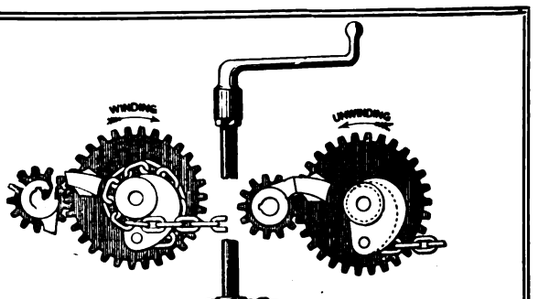

The "Peacock" IMPROVED Brake
(PATENT).
Note the simplicity of the Radial Contact pieces which render this the quickest of all geared hand brakes by
(1) Preventing the drum from over-running on release;
(2) Stopping the drum always at the point from which recovery of chain is most rapid;
(3) Eliminating all idle turning of the handle.
THE "PEACOCK" BRAKE CO., 27, CLEMENTS LANE, LONDON, E.C.

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THE
Tramway and Railway World

Established in 1892 and Published by

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One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, MAY 16, 1914.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

ROAD CHARGES ON OMNIBUSES.

The action of a Select Committee of the House of Commons in sanctioning a clause imposing a road maintenance charge on motor omnibuses using the new western road out of London promises to be a landmark in legislation. If the Middlesex County Council's Bill to authorise the construction of the road finally passes without alteration of this clause it will be a precedent which is bound to be followed up in regard to omnibuses using other roads. Some two years ago Parliament put on the promoters of trackless trolley schemes an obligation to contribute to road maintenance, except, of course, where the promoters are also the road authorities. In one or two instances an obligation has also been put on local authorities seeking to run omnibuses outside their areas. No obligation has been or could be put on companies running omnibuses, as they do not require to obtain Parliamentary powers. The damage done to the roads of the Middlesex County Council has already run into hundreds of thousands of pounds, and the annual cost of maintenance has doubled and, in some cases, trebled. The omnibuses have contributed nothing towards the cost. In the third place, the congestion of the Bath Road, especially where it passes through Brentford, has so increased since the advent of the motor car and the motor omnibus as to become intolerable. There is no alternative road, and none can be constructed except at great cost. A scheme was consequently evolved for the construction of a great new western road from South Kensington right out to the country, to join the Bath Road far beyond the region of congestion. The London County Council, however, did not come into the scheme, so the Middlesex County Council have gone forward with a Parliamentary Bill of their own to construct the part of the proposed road which would be within their territory—namely, from Chiswick to Hounslow, a distance of five miles. The cost is to be about half a million, and the Road Board will contribute largely. The County Council, smarting under the heavy expenditure on road maintenance, seized the opportunity and inserted in their Bill a clause prohibiting the use of the new road by motor omnibuses unless the omnibus companies contributed to the cost of maintenance of the road. The House of Commons Committee on the Bill have passed the clause in a form providing that any authority, company, or person working a service of mechanically propelled omnibuses on any part of the new road is to pay to the County Council three-eighths of a penny per omnibus mile run. The opposition to the clause will no doubt be continued in the House of Lords, but the omnibus companies' position seems untenable. If the County Council Bill gets through as it stands, the call will become overwhelming for general legislation to put a road maintenance charge on all omnibuses. After all, that will only be putting them on some sort of equality with the tramways and granting the latter fair play. As to the proceeds of a charge of three-eighths of a penny per mile run—the same charge as that imposed on several trackless trolley schemes, including that of Walsall Corporation last week—it may be assumed in round figures that an omnibus runs at least 100 miles per day. That gives a daily charge per omnibus of 3s. 1½d., or £57 per annum. That is not a very deadly sum; it is only a little more than the petrol tax; it is much less than the charge per tramcar for road maintenance and rates. If it is said that the omnibus cannot stand it, then the omnibus should not be run at present fares.

THE LINKING-UP OF LONDON TRAMWAYS.

We congratulate the Highways Committee of the London County Council upon their decision to invite the assistance of M. Mariage in consolidating and linking up their tramway routes. M. Mariage has for some years been a member of the Council of the Permanent International Tramways Union, an organisation which embraces the leading tramways, both private and municipal, of the Continent, and is known to many of our readers as the able and enterprising "directeur-general of the Compagnie Generale des Omnibus de Paris." In that capacity he is carrying out the reorganisation of the street locomotion in that city, including both the omnibus and tramway services, and he has had to deal with a situation somewhat similar to that which confronts the London County Council to-day. The blot on their system is the central London area, through which motor omnibuses perambulate without let or hindrance, while it is almost closed to the tramways. A dozen or more dead ends impinge on this crowded area, which is crossed only by one tramway route. Clearly the problem which is most pressing, which calls aloud for solution in the interest of the general public, is that of providing connecting links across this prohibited area. The influence of prejudice and insularity has, however, always maintained a barrier against this which has so far withstood all assaults. What is wanted is not a mere plan—that could be drawn up without serious difficulty—but the force of conviction working on the minds of members of Parliamentary Committees, who deal with the Council's proposals. We take it that the persuasive influence which the experience of M. Mariage will exercise in this direction is the main

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reason that has induced the Highways Committee to invite his aid. It is a wise decision, and by unanimously approving the recommendation of the Committee the members of the Council have shown themselves wiser than many of the critics who have commented on the proposal. It conveys no reflection on British tramway men, nor does it imply that the Highways Committee have any intention of linking up the "dead ends" by services of motor omnibuses. A gentleman described as a "leading London traffic expert," whose experience, no doubt, relates more to the design of vehicles than to traffic management, is credited with putting forward the latter suggestion. The critic has no doubt overlooked the fact that although anybody else may obtain licences for omnibuses in London, the Council would have to face the task of securing Parliamentary powers, in which it could hardly hope to be successful. Circular services in the whole area of all the "dead ends" might, perhaps, prove profitable, on account of the pick-up traffic to be met with, but in face of competition by through running omnibuses, the fares would need to be on the verge of unprofitableness in order to induce passengers to change from omnibus to car and *vice versa*. Two years' experience of competition has brought about results of a nature that are not likely to induce Parliament to sanction such an extension of the rivalry. Apart from its unsatisfactory financial effects, there are two other even more serious results that may be apprehended as a sequel to this enlargement of the area of competition. As yet there is no indication that the Government are alive to the urgency of the need for a Traffic Board, and in the absence of such an authority there would be increased danger to the public from the running of privately and publicly-owned omnibuses side by side. A rise in the number of accidents would be inevitable. Two years ago there was a hope that the question of working agreements would have been taken into consideration by the Highways Committee, but a banging of the drums of the so-called popular press apparently had the effect of turning them from their desire. But whatever may be done in the way of amicable working, there is no doubt that the tramways will ultimately obtain two or more much needed through-routes.

THE "BRITNIC" BRITISH NICLAUSSE BOILERS AT SOUTHEND-ON-SEA.

A description of the steam generating equipment erected for the Southend Corporation by the British Niclausse Boiler Company, Limited, Caxton House, Westminster, S.W., was given in our illustrated issue of May 7. On the following day a public inspection of the plant was arranged by the company, to which some fifty engineers from all parts of the United Kingdom and a few representatives of the technical Press were invited, and all of whom, with very few exceptions, were able to attend. The guests were met at Fenchurch Street Station by Mons. Albert Niclausse, Captain H. Riall Sankey, R.E. (ret.), a director, and Mr. Wm. Yorath Lewis, the managing director and engineer of the company; at Southend, thanks to the good weather, the party were able to take full advantage of the admirable arrangements prepared for their instruction and entertainment.

On arrival at Westcliff, two handsome Daimler chars-a-banc conveyed the party to the power house, where they were received by Mr. Robert Birkett, the borough electrical engineer and general manager, to whose foresight and enterprise the installation is due. The visitors were obviously much impressed with the installation, to the examination of which some two hours were devoted, and were informed that 4,000,000 h.p. (not 400,000 as previously stated through a typographical error) of the Niclausse boilers were in service at present, and 200,000 h.p. of their patent stokers.

The points to which particular attention was drawn were that the boilers were made of any capacity up to 60,000lbs. of steam per hour, and were capable of low operating cost; excellent efficiencies both under test and on the average over long periods of ordinary working; and enormous overloads. The boilers are remarkably compact, and require only 14ft. head room. The evaporation per square foot of ground occupied works out at from 175lbs. at normal load and 350 at overload per hour when hand-fired with fuel of 14,000 B.T.U.; when stoker-fired the figures attained are 150lbs. and 200lbs. respectively, with fuel of 10,000 B.T.U.; an efficiency of over 90 per cent. has been recorded, and this, it is claimed, is the highest ever attained over a long test period. It was seen that the boiler parts are very substantial though light, and easily put together, and that they ensure ready access to all parts; steam can be raised in them in half an hour and the radiation losses are small, the top of the boilers being quite cool. The low pressure forced draught stokers require plain chimneys only 100ft. high, and consume very little power for both stokers and fans. The admirably clean condition of the boiler house and the excellence of the workmanship and design was noticed by everyone.

Mons. A. Niclausse took the chair at the dinner, which took place in the fine winter gardens of the Palace Hotel facing the sea. The toast of "The King" was proposed in graceful terms, and in French by the chairman.

Mr. R. A. Chattock, city electrical engineer of the Birmingham Corporation, gave the toast of "The President of the French Republic," whom he congratulated on having such intellectual and energetic engineers in his country. The example they had seen that afternoon of the Niclausse boilers proved that the work done in France was equally as good as any done in this country. He had never seen better workmanship in his life than he had seen that day. He wished the innovation every success in this country.

Captain H. Riall Sankey, in proposing continued success to the light railway and electrical department of the County Borough of Southend, coupled with it the name of Mr. Robert Birkett, who had selected these boilers after a careful study and investigation of their qualities demonstrated in several very large power houses.

Mr. Birkett, in the course of his reply, said that the work spoke for itself, and they had seen and generally admitted that the workmanship was excellent. The way the contractors had done the work was a credit to them. Of Mr. Lewis, managing director of the British Niclausse Boiler Company, Limited, the firm's representative in London, he could not speak too highly. In everything that he had wanted Mr. Lewis met him with complete satisfaction. Councillor H. Cooney, of the Borough Council, also acknowledged the toast; he said that nothing but the very best of everything would satisfy Southend, and that was why they had put down Niclausse steam generating equipment in their power house.

Mr. Wm. Yorath Lewis, in proposing the toast, "The Technical Press," said he thought that technical journalists might well be, and justly were, proud of their reputation for fair comment and unbiased reports of the many important installations that come under their notice. Consequently, he felt quite at ease that they would do justice to the *entente cordiale* equipment they had inspected that evening at the power house. Mr. Birkett had told him that after inspecting the works of MM. J. and A. Niclausse in Paris he had felt in recommending his committee to entrust them with the order that they were not placing themselves in the hands of foreigners in the usual sense, since the plant would be built almost entirely by English-made tools with which the Paris works abounded, whilst he also felt that the relationship between the two nationalities was much more real than that of ordinary friendship. He gratefully acknowledged such pleasing sentiments, and hoped that other engineers and the Press would view the situation in the same light. The installation they had seen was the first real and complete Niclausse steam generating equipment put down in an English corporation electricity works, and he felt he was justified from his own experience in much important engineering work, in claiming that they were the finest and most satisfactory steam generators in the world. The mechanical stokers were absolutely new to this country, and would no doubt be welcomed since these were capable of burning any fuel with perfectly satisfactory results. What they considered as a great feature of the plant was that beyond question they could get into a limited space far greater capacity than could be given by any other boilers.

Mr. Ernest Benedict briefly but cordially responded.

Mr. W. A. Chamen, chief engineer of the South Wales Electric Power Company and Treforest Electric Consumers' Company, proposed the health and prosperity of Messrs. J. and A. Niclausse. He was pleased to have seen such a splendid installation of Niclausse equipment at the power house, and from his experience of these excellent boilers at the Treforest electricity works, he felt sure that Mr. Birkett would find that he had made no mistake in adopting them. He wished the firm continued success, and coupled the name of Mons. Albert Niclausse, who briefly responded to the cordial reception he had received.

The hosts were warmly congratulated on the signal success and interest of the day's outing, and the guests separated with very favourable anticipations of the future of the new boiler in this country.

Aberdeen Provisional Order.—Approval has been given to a Provisional Order of the Aberdeen Corporation by the Commissioners appointed under the Private Legislation Procedure (Scotland) Act of 1899. The Order confers powers to construct three tramway lines, to run mechanically propelled vehicles and trolley omnibuses along certain streets; to provide motor omnibuses, and run such vehicles within the city and on one route beyond the city boundary. Powers are given to appropriate each year any sum or sums not exceeding one-third of the free surplus revenue of the tramways department, and apply the same to the common good, or towards the reduction of the city rates, or in carrying out city improvements.

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PRIVATE BILL LEGISLATION.

BELFAST CORPORATION.—The chairman of Committees in the House of Lords on May 6 ordered to be reported for third reading, as an unopposed measure, the Belfast Corporation Bill to authorise the expenditure of a further sum of £15,000 for the laying out and equipment of the lands at Drumnadrough, and, if that prove insufficient, to apply to the Board of Trade for such further sums as may be necessary. The project is in connection with the tramways department, partly as a means of traffic inducement.

BRANKSOME AND POOLE RAILLESS TRACTION.—This Bill for the provision of a system of railless trolley traction for Branksome Park, Canford Cliffs, and the Poole Sandbanks, came before a Committee of the House of Lords. The Committee decided that the preamble had not been proved.

LEEDS CORPORATION.—A Committee of the House of Lords, presided over by the Earl of Plymouth, on May 13, began the hearing of this Bill, which, among other things, sought powers to extend the railless trolley car route and the tramways to Otley and Burley. In presenting the Corporation's case Mr. Lankaster, K.C., referred to the petition of the West Riding Council. It was the duty of that Council, he said, to keep up their roads for the purpose of heavy traffic, and if any extraordinary traffic came beyond what had been anticipated their remedy could be obtained under the Act of 1878 as amended.

LONDON COUNTY COUNCIL.—Mr. Soames's Committee of the House of Commons on May 11 approved of the clause for the construction of an overhead trolley tramway from Lee Green, where there is at present a terminus, along Eltham Road, to join the Well Hall Road line from Woolwich. The Committee expressed the opinion that the roadway should be paved with wood in the residential parts of the line. The Committee sanctioned a clause which empowered the Council to work Askew Road and Paddenswick Road lines in the Hammersmith district within the county boundary, which are being purchased from the London United Tramways Company. As the result of a conference between counsel on the question of running powers for the London United Company, Mr. Lloyd, K.C., stated that the company had agreed to withdraw their petition against the Bill without prejudice to their rights in the House of Lords, in the belief that in the meantime they could come to terms. The Bill, as amended, was ordered to be reported for third reading.

MOTOR OMNIBUSES USING A NEW LONDON ROAD TO CONTRIBUTE TOWARDS MAINTENANCE.—On May 8 the Select Committee of the House of Commons, presided over by Colonel Bathurst, approved of a clause embodying their decision for omnibuses to contribute ⅜ of a penny per car mile if such vehicles use the new road which Middlesex County Council propose to construct from Chiswick to the Bath Road. Before giving their decision the Committee heard the cross-examination of Mr. H. T. Wakelam, the Council's surveyor, by Mr. Balfour Browne, K.C., who represented the London General Omnibus Company. Mr. Wakelam admitted that motor cabs and vegetable carts would pass over the road, but said there was not a continuous user in the case of these, and they did not damage the road as motor 'buses did. The right of omnibuses to go free on every road out of London ought not to be allowed. Asked if the omnibuses were not doing a great service to the public, he replied, "So are the tramways, but they have to pay for the maintenance of the roads."—Mr. Browne: Are not tramways a little out of date?—Mr. Wakelam: I think not.—The clause, as adjusted, provides that the company shall pay a sum equal to three-eighths of a penny per car mile by any motor, or other omnibus, over the new roadway, towards the cost of the maintenance of such roadway; all sums to be paid quarterly, and to be deemed to be debt due to the Council, and recoverable from the company. It is further provided that the company shall keep a daily record, showing in proper detail the number of journeys and the mileage run by each omnibus on the new roadway, and shall furnish statements of such journeys and mileage quarterly, and the company shall allow any person duly authorised by the Council at all reasonable times to inspect and take copies of all such records and of any accounts kept by the company. The Bill was reported for third reading.

THERMIT ENTERPRISE.

Messrs. Thermit, Limited, London, have recently taken over the entire control of the Thermit patents in South Africa and India, and have arranged to send their chief engineer on an extended tour in these countries with a view to the development of the business, especially as regards the welding of tramway rails. He will leave London about the middle of July, and the tour will extend over a period of about nine months.

As "seeing" is often worth more than a good deal of "talking," Messrs. Thermit, Limited, are also sending out one of their welders with the necessary plant to enable them to give a practical demonstration of the process on every system in both countries. We understand that this proposal has been very well received by the various systems, and we feel sure that the firm's many friends in this country will wish them the success that such an enterprising scheme deserves. Besides demonstrating the process to new systems, the visits will enable existing customers to see the latest methods, and thus be brought up to date in the details of carrying out the work. The process has already been adopted on a number of systems, including Colombo, Singapore, East London (South Africa), etc., and it is hoped that by means of a personal tour the sphere of operations may be materially increased.

L.C.C. TRAMWAY MATTERS.

The London County Council met on Tuesday last, when the Highways Committee presented the following reports:—

THROUGH RUNNING FARES VIA BOW BRIDGE.

As the result of communications with Leyton Urban Council and West Ham Corporation with regard to certain long distance fares charged on the through running routes *via* Bow Bridge, the Highways Committee had made arrangements for the institution of 3d. single and 5d. double journey fares between Aldgate and Leyton ("Bakers' Arms") and Epping Forest ("Rising Sun"). For 2d. single stages the return fare is 3d., and for 2½d. single stages 4d.

PARIS MANAGER TO ADVISE ON LINKING UP TRAMWAY SYSTEM.

The Council in December last approved a special estimate of expenditure on maintenance account of £750 in respect of the preparation of schemes for the consolidation and linking up of the tramways. This amount did not provide for the cost involved in obtaining the views of any experts which it might be decided to engage at a later date. The Highways Committee were of opinion that the ordinary professional expert would not be likely to render any material service to the Council, in view of the fact that the schemes already placed before the Committee by the Council's officers are the result of mature deliberation and of close study of, and daily personal contact with, the tramway traffic problem of London as it has developed during the past ten years. They had accordingly directed attention to other large cities where the conditions attaching to passenger traffic approximated as nearly as possible to those which obtain in London. They were of opinion that Monsieur A. Mariage, Directeur General, Compagnie Generale des Omnibus de Paris, was the most suitable person to consult with regard to the various phases of the problem. M. Mariage had had unique experience inasmuch as he was responsible for both tramway and omnibus services. He had also had to deal with the problem of "dead-ends." M. Mariage rendered considerable assistance to the Council in connection with the running of trail cars and sent one of his assistants to give evidence in support of the Council's application to Parliament for powers in respect thereof. M. Mariage was prepared to assist the Council in the matter on the following conditions:—(i.) That a personal fee including all travelling and hotel expenses, etc., of £250 shall be paid to him; and (ii.) that a fee of £75 shall be paid to an assistant to accompany him to London, to act as his interpreter, and to translate all documents into English. The Committee were advised that this offer was reasonable, and they recommended accordingly.

TRAMWAY FITTINGS, EQUIPMENT, ETC., 1914-15.

The contract for the supply during 1914-15 of brake pull-rod nut catches was awarded to Geo. Salter and Co., West Bromwich, who were also the contractors for 1913-14 at a slightly higher price. No articles under the contract for 1913-14 were, however, accepted until the tender for 1914-15 had been sent in. Geo. Salter and Co. had now informed the Committee that their price for 1914-15 for the article (which consists of a forging, spring and rivet) only included the supply of the spring, and not of the complete catch as shown on the sketch. They had supplied complete catches at a loss under the contract for 1913-14, and desired to be released from their contract for the ensuing year so far as this item was concerned. It was recommended that the request be complied with.

The foregoing reports were adopted.

OMNIBUSES AND STREET IMPROVEMENTS.

Mr. Ward has given notice to move: "That inasmuch as there is no impediment to the unrestricted use by motor omnibuses of public thoroughfares in London, many of which have been widened and improved partly at the expense of the tramways account, it is not justifiable to charge the tramways account with any portion of the cost of future street improvements, and that those cases in which effect has not yet been given to the Council's resolution apportioning the cost of street improvements along tramways routes be not further acted upon."

BY-LAW AS TO BREAKDOWN OF VEHICLES.

Report was made by the Local Government Committee that in November last the Council made the following by-law under section 23 of the Municipal Corporations Act, 1882, and section 16 of the Local Government Act, 1888, in regard to the breakdown of vehicles in streets in London:—

> In any case where a vehicle breaks down and causes obstruction to traffic in any street or public place and the breakdown of such vehicle is due to its defective condition or to its being over-loaded, the owner of such vehicle or any other person who caused or permitted it to be used and the driver thereof shall each be guilty of an offence and be liable on conviction to a penalty not exceeding 40s. Provided that no person shall be convicted under this by-law if he satisfies the court that he had taken all reasonable means to put and maintain the vehicle in proper condition or to prevent its being overloaded, or, being the driver of the vehicle, that he was unaware of its defective or overloaded condition.

A copy of such by-law was submitted to the Secretary of State, who on two occasions advised his Majesty to extend the time within which the by-law should not come into force by 60 and 40 days respectively, in order to give time for the consideration of various objections which had been made. A letter had now been received to the effect that the extended time had expired and had not been further extended, and that the by-law had not been disallowed by the King in Council. The by-law was consequently in force, and as it was one of considerable importance, the Committee were taking steps with a view to its being made known.

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MISCELLANEOUS NEWS AND NOTES.

A Walsall Scheme.—The Corporation have adopted a scheme for the erection of a power station and the provision of plant at an estimated cost of £80,000.

Proposed Queensland Tramways.—A scheme is under consideration for the construction of tramways in Ispwich, Bundamba, Brassall, and Purga, Queensland.

New Cars at Nottingham.—Eight of twenty new cars which have been ordered by the Corporation tramways department have been delivered by the Brush Engineering Company. The platforms are fitted with glass fronts.

Repairs and Renewals at Devonport.—The secretary of the Tramways Company has informed the Council that an expenditure of over £3,000 upon renewals, apart from the ordinary repairs, during the current year has been authorised.

Tramway Traffic at a Glasgow Launch.—During last Sunday morning the tramways conveyed 50,000 passengers from central points to Dalmuir and Renfrew on the occasion of the launch of the Cunard liner "Aquitania" at Clydebank.

Municipal Omnibuses from the Centre of Manchester.—The Watch Committee have licensed seven motor omnibuses belonging to the Tramways Committee to ply for hire on a route from the city centre to the boundary at Chorlton-cum-Hardy.

Bury Power Station Extension.—An inquiry into the application of Bury (Lancs.) Council for sanction to borrow £62,502 for the extension of the generating station and the provision of mains was held on May 12 by the Local Government Board.

Dundee Railless Trolley Cars to Cease Running.—Owing to the poor financial return, the unsuitability of the road surface, and the refusal of the Council to put the roadway in a proper condition the railless trolley car service on Clepington Road has been discontinued.

Omnibus Service from Doncaster.—The Tramways Committee have arranged with Mr. P. H. Marco, general manager of Barnsley and District Electric Traction Company, with regard to the licensing of motor omnibuses to ply for hire between Doncaster and Goldthorpe by way of Hickleton and Marr.

Suggested Free Rides for Manchester Children.—The Parks Committee of the Corporation have asked the Tramways Committee to place at the disposal of the Parks Committee a number of tramcars during the holidays, in which 10,000 children of the poorer districts will be carried to the nearest parks for five hours' play on Wednesdays and Saturdays.

The Institution of Automobile Engineers.—The next ordinary meeting of the Institution in London will be held on Wednesday, May 27, when a lecture will be given by Dr. A. M. Low, entitled "Relative Motion." The lecture will be illustrated by a number of cinematograph films and experiments, and attention will be directed to the bearing of these experiments upon automobile design and construction.

Car Equipment at Oldham.—Councillor Isherwood, chairman of the Tramways Committee, was asked at a meeting of the Council on May 6, whether the equipment for the 12 new cars to be purchased would be similar to that over which trouble had been caused. He replied that last year the cars containing the equipment referred to were booked to run 367,000 miles, and ran within 115 miles of that figure for the whole year. That was not a great deal to lose.

Discussion on Transportation.—In connection with the visit of fifty American Mayors to the Anglo-American Exposition at Shepherd's Bush this summer, a number of British Mayors and other gentlemen met recently to consider a scheme for conferring with the visitors on various subjects. The Hon. Arthur Stanley, M.P., was one of those present, and the subject of transportation was included among the subjects which it is proposed to discuss.

Hatpin By-Law for Cardiff.—The Home Secretary has expressed doubt whether so wide a by-law as that submitted by the Council with regard to hatpins could be properly made. He has suggested that the Council make an experiment of a much more restricted character—namely, that any prohibition of the wearing of dangerous hatpins should be applied to such places as tramcars, omnibuses, etc., where the danger is greatest. The letter has been referred to the Watch Committee.

A London Collision.—While traffic was heavy on the morning of May 11 a single truck car rounded the sharp curve from Blackfriars Bridge at too fast a speed, left the rails apparently, and collided with a bogie car which had almost come to a standstill at the Embankment Shelter. The leading car was forced off the rails at an angle, and had several windows smashed, while the second car also sustained considerable damage to the platform and covered top-deck. Fifteen persons were treated for injuries, but only one was detained at the hospital.

Traders and Chocolate Machines on London Cars.—Leeds and West Riding Confectioners' Association have decided to support the protests made by the London Confectioners Association and the British Federation of Confectioners Associations against the adoption by the London County Council of automatic chocolate machines on their tramcars on a West London route. It was stated that the Council, on being approached, replied that they had agreed to allow the machine to be installed for a term of six months as an experiment. The meeting decided to reopen the question at the next meeting of the Federation.

Birmingham's Reserve and Rate-Relief Grants.—A decision was arrived at by the Tramways Committee on May 12, as the result of the past year's working, to place £31,000 to the reserve fund and £44,971 to the relief of the rates. The previous year £56,000 was given to rate-relief, and £45,000 was placed to reserve, but since then the rates on the undertaking have increased by £18,000 owing to re-assessment. The working expenses per car mile have increased from 6.764d. to 7.494d., .27d. of the increase being due to the increase in the rates. The committee have reported against halfpenny fares, an extension of the time of issue of workmen's tickets, and a service of all-night cars.

Assistant Conductors.—So far the tramways department of the London County Council have not put forward any candidates to be licensed by the New Scotland Yard Authority as assistant conductors, although the Home Secretary's order giving permission to do so came into force on May 1. The London and Provincial Vehicle Workers' Union intend to approach both the Home Secretary and the County Council in opposition to the order, although it is intended that only a limited number of licences shall be issued until it is seen whether the new system proves satisfactory. The union men's greatest objections are comprised in the allegations that the licensing of boys of 16 will be the first step in the direction of cheap labour, and that in the event of a strike the assistant conductors will be used to displace the men.

CONTRACTS AND ORDERS.

Hadfields, Limited, have received an order from West Hartlepool tramways for the supply of points and crossings, at £176.

Cars for Johannesburg.—Orders for 15 car bodies and trucks have been placed in the United Kingdom by Johannesburg tramways department.

J. W. Courtenay, Limited, have recently secured a renewal of their lease of the exclusive rights of advertising on the Scarborough Tramway Company's cars.

Belfast Council have accepted the tender of Dick, Kerr and Co. for the construction of permanent way of the tramways during the year ending March 31 next.

Bradford Council have placed a contract with the Phœnix Dynamo Manufacturing Company for the supply of three motors required for driving the new induced draught fans to be installed at Valley Road generating station, at £1,087.

Gloucester Council have placed a contract with the British Insulated and Helsby Cables for cables at £630. Among the tenders for annual supplies to the electricity and light railways department which have been accepted is that of the Tyne Metal Company for brake blocks.

Manchester Council have awarded contracts as appended:—Two sets of soot cleaning apparatus, British Vulcan Soot Cleaner Company, Limited; L.T. switchboard for Stuart Street station, Edison and Swan Company, Limited; cable, Western Electric Company, Limited; H.T. sub-station switchboard, Electric Construction Company, Limited.

Burnley Council have accepted tenders as subjoined:—British Thomson-Houston Company, electric motors and starters; Phœnix Dynamo Manufacturing Company, two motor-driven pumps, £445; Dorman Long and Co., Limited, steel girders for foundations of the new central station plant, £70; Galloways, Limited, Lancashire boiler, £555; Siemens Bros., cable, £150.

Glasgow Council have accepted the tender of the British Thomson-Houston Company for three 1,000 kw. rotary converters, at £6,472, and of the British Westinghouse Company for three 500 kw. rotary converters, at £3,799. The following tenders for supplies to the tramways department during the ensuing year have been accepted:—

Steel forgings for car trucks, Brush Electrical Engineering Company; steel wheels, John Baker and Co., Limited; steel tyres, Brown Bayley's Steel Works, Limited; steel axles, Glasgow Railway Engineering Company, Limited; bolts and nuts, Rivet, Bolt and Nut Company, Limited, and P. and W. MacLellan, Limited; chilled-iron brake bolts, Miller and Co., Limited; iron castings, R. Howie and Co., James Allen, sen., and Son, Limited, and David King and Son; steel castings, Dickson and Mann, Limited, and Carntyne Steel Castings Company, Limited; malleable-iron castings, Alex Shanks and Son, Limited; rubber and asbestos goods, North British Rubber Company, Limited, Rubber Company of Scotland, Limited, J. T. Goudie and Co., and Geo. M'Lellan and Co.; springs, G. Turton Platts and Co., Limited, and L. Sterne and Co., Limited; W.I. tubes and fittings, Stewarts and Lloyds, Limited, and Scottish Tube Company, Limited; galvanised steel wire, Wm. Bain and Co., Limited.

PERSONAL.

Councillor Wm. Phillips was, on May 12, appointed chairman of Pontypridd Electricity and Tramways Committee.

Mr. J. W. Horton has been confirmed in the appointment of traffic superintendent to York Corporation tramways.

Mr. R. H. Lee, resident engineer at Stockport Council's generating station, has been appointed chief assistant engineer.

Mr. C. Burgess, general manager and engineer, West Hartlepool Corporation tramways, has been granted an increase of salary from £200 to £250.

Mr. H. A. Howie, deputy city electrical engineer at Sheffield, was on May 11 appointed electrical engineer to Walsall Council at a commencing salary of £500 per annum.

Mr. G. F. Nayler has been confirmed in the appointment of electrical engineer and manager of Nelson Council tramway undertaking. He was provisionally appointed a year ago.

Melbourne Railways Management.—The Victorian Railway Commissioners have denied a statement that any of them intend to retire to make room for the appointment of an experienced electric railway manager for the Melbourne suburban lines.

Mr. F. Harding, general manager, Derby Corporation tramways, has received an increase of salary from £300 to £350. Councillor Dean, in proposing the Tramways Committee's recommendation, said that since 1906 the receipts had gone up from £34,200 to £51,000. Mr. Harding was a painstaking and hard-working official, and he should be treated accordingly.

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Mr. John Harper, acting Chief Commissioner for the New South Wales railways, has been appointed permanently to the position. Mr. H. Richardson has been appointed Assistant Commissioner, and Mr. H. F. Fraser Second Assistant Commissioner.

Swansea Directors and Manager.—At the Swansea Tramways Company's annual meeting the remuneration of the directors was fixed at £500 per annum. The chairman observed that for the results achieved they were largely indebted to the zealous and capable management of their general manager, Mr. David James, whose efforts were ably seconded by a loyal and efficient staff.

Lisbon Tramways Management.—In their annual report the directors of the Lisbon Tramways Company refer with the deepest regret to the death of the general manager, Mr. A. S. Giles, Mr. A. O. Kolkhorst has been appointed to the post thus rendered vacant of general manager and chief engineer. He was previously general manager of the Chilian Electric Tramway and Light Company in Santiago, and comes to the company with great experience in tramway management.

Mr. W. McHugh has been entertained at dinner by the office, electrical, and traffic staffs of Dublin Tramways Company, to mark his promotion to the post of chief accountant to the company, with which he has been connected since 1886. In proposing the health of the guest, Mr. R. S. Tresilian, the secretary, said that his duties were always discharged in the most efficient manner, and when emergencies arose he could always be relied on to step into the breach. Mr. McHugh, in reply, said it was a source of gratification to find that he had merited the good opinion of Mr. Tresilian and, through him, the directors.

Mr. W. Glendinning, who for forty years was cashier in the office of the Belfast tramways, has died in that city. He retired about a year ago.

Mr. J. Richardson, J.P., for many years a member of the firm of Liverpool solicitors, a director of the Liverpool Tramway Company, and who died on March 16 last, aged 79 years, left estate of the gross value of £29,339, of which £27,303 is net personalty.

Mr. C. J. Conaty, whose death was recorded in our issue of May 9, was 53 years of age. He received his technical training in Leeds, and he had served as engineer to the Dublin and Lucan Light Railway, engineer to the Birmingham and Midland Tramways Company, manager of the South Staffordshire Tramways Company, and manager of the Birmingham Tramways Company. Upon the system being taken over by the Corporation he began practise as a consulting engineer, and was greatly esteemed in the city and the Midlands.

FINANCIAL REPORTS AND MEETINGS.

Lima Light, Power and Tramways Company.—A dividend has been declared at the rate of 4½ per cent. for the past year.

Shanghai Electric Construction Company.—For 1913 the net profits were £34,726, and £1,974 was brought forward. A dividend of 7 per cent. is proposed, adding £10,000 to the renewal fund, writing £3,000 off preliminary expenses, and carrying forward £1,300.

Electric Construction Company.—The net profits for the ten months ended March 31 were £27,126 after providing for debenture interest, and £6,899 was brought forward. A dividend at the rate of 6 per cent. per annum is proposed on the ordinary shares, transferring £12,000 to the reserve fund, which will then amount to £58,000, and carrying forward £7,153.

Blackburn Corporation Tramways.—The report of Mr. J. H. Coweli, general manager, shows that the receipts amounted to £71,338, an increase of £4,655, and working expenses £47,170, an increase of £4,654; the balance of £24,168 is almost the same as that of last year. Interest and repayment of loans, contributions to sinking fund, and income tax require £20,157, leaving a profit balance of £4,011, as compared with £3,870. The percentage of working expenses to receipts, 66.10. The receipts from parcels amounted to £2,310, an increase of £116, the number of parcels being 335,172. Passengers numbered 12,731,532, and car miles 1,140,462. The average energy consumption was 1.64 units. The average total revenue per car mile was 14.08d., and total working expenses, 9.43d. The Corporation now has 61 cars. During the year 20 meters for current consumption were purchased, a further portion of the track has been relaid, the expense being borne out of revenue, and a passenger shelter has been erected at a cost of £49.

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TRAMWAYS & LIGHT RAILWAYS
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WEEKLY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended May 9 give total receipts of £231,305, or £4,513 more than in the corresponding week last year. The total length of track was 2,863 miles, or 24 more than for the corresponding week. Receipts were at the rate of £80 10s. 5d. per track mile, an increase of 18s. 1d. as compared with the corresponding week of last year.

THE BRITISH ELECTRICAL FEDERATION.

The traffic statement for the week ended May 8, 1914, shows that the receipts from tramways and railways amounted to £39,675 as compared with £38,302 in the corresponding week last year, and from omnibuses £14,161, as compared with £5,145, making a total of £53,836, as compared with £43,447. The tramway and railway route mileage was 429.82, as compared with 428.47. Upon such of the services as were working both last year and this year the receipts show an increase of £2,433 upon the week.

RAILWAYS OF THE UNITED KINGDOM.

The summary of the official traffic returns of the fifty principal railways of the United Kingdom for the week ended May 10 gives a total of £2,221,610, which was carried on 22,161 miles, being at the rate of £100 4s. 11d. per mile of line open. For the corresponding week of 1913 the receipts of the same lines amounted to £2,496,057, with 22,100 miles open, or £112 18s. 10d. per mile. There was thus a decrease of £274,441 in receipts (owing mainly to the fact that comparison is made with the week previous to Whit week last year), an increase of 61 in mileage, and a decrease of £12 13s. 11d. in receipts per mile. Thirty-six of the returns distinguish between the receipts from passenger and goods traffic, and these show a decrease of £232,036 (or £10 16s. 11d. per mile) in the passenger receipts and a decrease of £40,502 (or £2 0s. 5d. per mile) in the receipts from goods traffic. The aggregate receipts of the fifty railways since the beginning of the year amounted to £41,033,181, in comparison with £41,633,864 last year, a decrease of £600,683.

COPPER AND ALUMINIUM MARKET.

May 15, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

	Friday, May 15.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	63 5 0	63 0 0	69 15 0
,, (three months)	63 17 6	63 7 6	69 12 6
Electrolytic Copper—bars or ingots	65 15 6	65 10 0	72 15 0
Aluminium—bars or ingots	83 0 0	83 0 0	90 0 0

COAL MARKET.

May 15, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

	Friday, May 15.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	s. d.
Best Admiralty Welsh (large)	24 0	24 3	27 6	23 9
Best Seconds	23 3	23 6	27 0	23 0
Ordinary Drys	21 0	20 9	25 0	20 6
Best Washed Nuts	20 6	20 6	22 0	..
Best Washed Peas	19 6	19 6	20 6	..
Cardiff, f.o.b.—				
Best Admiralty (large)	19 6	19 9	23 0	18 9
Best Seconds	18 9	19 0	22 6	18 0
Ordinary Drys	16 6	16 3	20 6	15 6
Best Washed Nuts	16 0	16 0	17 6	..
Best Washed Peas	15 0	15 0	16 0	..
Newcastle, f.o.b.—				
Best Steams	14 0	14 6	16 6	14 3
Best Seconds	12 6	12 6	14 9	12 6
Smalls	8 6	8 6	11 6	10 0

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregate. Wks.	Aggregate. 1913-4.	Increase or Dec.
Anglo-Argentine	May 6	£52,834	£53,712	18	£1,018,650	+ £17,561
Auckland (28 days)	April	20,216	21,702	41	204,124	+ 4,813
Ballarat and Bendigo	March	3 904	4,151	50	47,694	— 701
Brazilian St. Rly. Mlrs	March	46,496	54,582	34	423,040	+ 65,379
Brazilian Traction	May 2	88,084	90,000	18	1,699,869	+ 76,085
Brisbane	April	25,390	28,610	17	110 525	+ 11,095
British Columbia $	March	720,493	717,251	39	6,752,082	+ 349 161
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacroze	April	44,215	43,411	43	445,538	+ 6,311
Calcutta Rs.	May 9	62,256	67,986	18	12,85,422	+ 61 454
Cape Town	March	13,197	13,992	13	41,980	+ 2,693
Carthagena & Herreria	April	3,050	2,069	17	10,189	— 2,933
Cordoba	March	12,668	13,499	52	159,207	+ 13,593
East India	April	1,760	1,837	39	17,239	+ 717
Kalgoorlie	April	3,073	2,820	17	9,805	— 1,508
La Plata	April	5,307	4,716	17	19,956	— 1,639
Lima	Feb.	32,206	38,880	9	71,758	+ 5,423
Lisbon Mlrs.	Jan.	...	156,175	4	156 175	...
Madras (14 days) Rs.	April 30	27,549	30,297	17	233,027	+ 20,307
Melbourne	Feb.	62,500	64,000	9	132 500	+ 3,000
Mexico $	March	606,411	617,654	13	1,750,819	+ 253,412
Montevideo	April	30,087	29,645	26	200,176	+ 414
Para	May 3	4,030	3,581	22	76,363	— 14,561
Port Elizabeth	March	3,943	4,535	13	12,875	+ 844
Puebla $	March	62,500	67,300	13	195,400	+ 23,800
Rangoon Tramways	April	5 351	5,367	17	22,014	+ 675
Shanghai $	May 6	21,170	26,200	18	435,660	+ 74,319
Singapore $	May 9	12,718	12,495	18	227,430	+ 9,247
Toronto $	March	772,491	886,328	13	2,461,956	+ 194,324
Winnipeg $	March	329,016	347,812	13	1,081,461	+ 80,516

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks	1913-4.	Increase or Dec.
Aberdeen Corporation..	May 6	£1,633	£1,752	+ £98	49	*78,207	+ £4,797
Accrington Corp.....	" 6	534	571	+ 17	5	3,139	+ 286
Ayr Corporation	" 9	260	274	+ 14	51	18,072	+ 2,629
Bath Electric	" 6	793	900	+ 107	18	14,418	+ 1,129
Birkenhead Corp.	" 10	1,221	1,247	+ 26	5½	7,481	+ 345
Birmingham Corp.	" 9	11,499	12,359	+ 860	6	71,507	+ 5,646
Blackburn Corporation	" 6	1,215	1,273	+ 58	6	8,547	+ 1,415
Blackpool Corporation	" 7	670	814	+ 144	4½	7,895	+ 3,871
Bolton Corporation	" 10	2,677	2,696	+ 19	6	16,937	+ 1,539
Bournemouth Corp.....	" 13	2,616	1,782	— 834	6	12,991	+ 906
Bradford Corporation..	" 9	6,149	5,959	— 290	6	36,746	+ 3,992
Brighton Corporation..	" 10	1,046	899	— 147	5½	6,146	+ 848
Bristol	" 8	7,328	8,155	+ 827	18½	138,739	+ 13,896
British Elec. Federatn.	" 8	43,417	53,836	*	...	...	...
Burnley Corporation ..	" 9	1,642	1,606	— 36	6	10,563	+ 862
Burton-on-Trent Corp.	" 10	290	297	+ 7	6	1,731	+ 95
Bury Corporation.....	" 10	1,354	1,291	— 63	5½	8,304	+ 634
Cardiff Corporation.....	" 2	2,545	2,732	+ 187	4	13,337	+ 1,297
Chatham and District..	" 7	849	870	+ 21	18	15,697	+ 447
Chesterfield Corp.	" 7	244	323	+ 79	5	1,635	+ 351
Colne Corporation	" 9	270	262	— 8	...	...	...
Cork Electric.....	" 7	494	484	— 10	18	8,454	+ 166
Croydon Corporation ..	" 1	1,594	1,789	+ 195	4	8,391	+ 1,342
Darlington Corporation	" 9	261	246	— 15	6	1,549	+ 126
Derby Corporation	" 9	932	916	— 16	5½	5,909	+ 578
Dover Corporation	" 9	217	209	— 8	6	1,370	+ 159
Dublin & Lucan	" 8	134	135	+ 1	18	2,268	— 29
Dublin United	" 8	5,978	5,878	— 100	19	99,561	— 2,642
Dundee City	" 6	1,314	1,328	+ 14	51	66,426	+ 4,313
East Ham Corporation	" 9	1,093	1,007	— 86	5½	5,939	— 62
Exeter Corporation	" 8	312	323	+ 11	6	2,000	+ 287
Gearless Motor 'Buses.	" 9	...	468	...	19	8,617	...
Glasgow Corporation ..	" 9	20,382	21,263	+ 881	49	1,009,482	+ 68,853
Glossop(U.Elec.Supply)	" 9	135	128	— 7	19	2,325	— 25
Halifax Corporation ...	" 5	2,001	2,003	+ 2	5	11,421	+ 1,694
Hastings & District.....	" 6	877	874	— 3	18	14,672	+ 255
Huddersfield Corp.	" 9	2,111	2,200	+ 89	6	13,514	+ 1,774
Hull Corporation	" 9	3,104	3,144	+ 40	6	18,086	+ 525
Ilford U.D.C.	" 9	447	472	+ 25	5	2,897	+ 445
Ilkeston Corporation ..	" 13	167	122	— 45	6	814	+ 4
Ipswich Corporation ..	" 9	417	417	Nil	6	2,529	+ 338
Isle of Thanet	" 9	481	442	— 39	32	11,885	+ 1,041
Kilmarnock Corp.	" 9	181	175	— 6	51	8,902	+ 513
Lanarkshire	" 7	1,609	1,912	+ 303	18	33,969	+ 4,745
Lancashire United	" 6	1,419	1,610	+ 191	18	28,876	+ 3,840
Leeds City	" 9	8,290	8,067	— 223	6	48,539	+ 4,691
Leicester Corporation...	" 9	2,791	3,029	+ 238	19	53,005	+ 3,449
Leith Corporation	" 9	704	718	+ 14	51	36,147	+ 1,848
Leyton U.D.C.	April 2	324	342	+ 18	½	342	+ 18
Liverpool Corporation..	May 9	12,679	13,143	+ 464	18½	238,059	+ 12,901
Llandudno &Colwyn B.	" 8	236	228	— 8	24	4,275	+ 96
London County Council	" 6	42,111	43,642	+ 1,531	5	228,531	+ 13,511
London Gnl. Omnibus..	" 9	63,327	63,517	+ 190	19	1,106,758	+ 35,283
London United	" 8	5,855	6,175	+ 320	19	107,298	+ 5,835
Lowestoft Corporation	" 9	163	168	+ 5	31	5,713	+ 752
Maidstone Corporation	" 7	188	198	+ 10	6	1,265	+ 208
Manchester Corp.....	" 9	17,350	17,710	+ 360	6	101,907	+ 6,990
Met. Elec. Trys.	" 8	8,984	9,226	+ 242	19	163,395	+ 5,232
Nat. Steam Car Co., Ltd.	" 7	2,895	4,641	+ 1,746	31	105,693	+ 46,835
Nelson Corporation.....	" 9	194	196	+ 2	5½	1,243	+ 87
N'castle-on-Tyne Corp.	" 9	4,873	5,089	+ 216	6	29,602	+ 3,132
Newport (Mon.) Corp....	" 9	713	803	+ 90	6	4,772	+ 558
New St. Helens & Dist...	" 8	750	790	+ 40	45	36,398	+ 3,275
Northampton Corp	" 6	580	597	+ 17	5½	3,267	+ 287
Nottingham Corp.	" 9	3,285	3,362	+ 77	5½	18,658	+ 1,164
Oldham Corporation ...	" 10	2,225	2,212	— 13	7	15,760	+ 1,439
Portsmouth Corp.....	" 9	1,941	2,038	+ 97	6	13,395	...
Preston Corporation ...	" 6	874	878	+ 4	6	5,364	+ 323
Provincial	" 9	1,700	1,818	+ 118	31	55,654	+ 3,832
Reading Corporation ...	" 7	647	673	+ 26	5	3,826	+ 456
Rhondda.....	" 7	1,210	1,240	+ 30	18	22,143	+ 1,182
Rochdale Corporation	" 9	1,617	1,572	— 45	6	8,657	+ 930
Rotherham Corp.....	" 13	1,303	961	— 342	6	5,885	— 50
Salford Corporation ...	" 11	5,278	4,883	— 395	6	30,285	+ 1,259
Sheffield Corporation...	" 10	7,657	7,463	— 194	6½	50,350	+ 2,749
Southampton Corp.....	" 6	1,191	1,273	+ 82	5	6,873	+ 623
Southend-on-Sea Corp.	" 6	747	846	+ 99	6	5,084	+ 1,517
South Met. Trys.	" 8	795	1,114	+ 319	19	19,442	+ 5,736
South Shields Corp.....	" 9	706	727	+ 21	5½	4,319	+ 745
Sunderland Corp.....	" 10	1,411	1,343	— 68	6	8,211	+ 456
Sunderland District ...	" 6	561	558	— 3	27	15,528	+ 1,448
Swindon Corporation ...	" 6	145	159	+ 14	5	927	+ 157
Torquay.....	" 7	482	471	— 11	18	8,645	+ 498
Trys. (M.E.T.) 'Buses	" 9	2,990	9,052	+ 6,062	19	159,481	...
TynesideTrys.&Tmrds	" 6	520	511	— 9	18	9,378	+ 621
Wallasey Corporation	" 9	1,151	1,239	+ 88	5½	7,215	+ 851
Walsall Corporation ...	" 9	644	615	— 29	19	11,597	+ 816
Walthamstow U.D.C....	" 9	700	743	+ 43	6	4,739	+ 975
Warrington Corp	" 7	455	438	— 17	5	2,351	+ 10
West Ham Corporation	" 7	2,703	2,780	+ 77	5	15,501	+ 1,290
Wigan Corporation	" 7	1,501	1,488	— 13	5	8,185	+ 545
Wolverhampton Corp	" 13	1,541	998	— 543	7	6,746	+ 21
Yorkshire (W. Riding)	" 10	1,483	1,356	— 127	19	27,046	+ 1,133

* From such of the services as were working both last year and this year the receipts show an increase of £2,433 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London.....	May 9	£5,119	£5,005	— £114	19	£96,180	— £4,455
City and South London	" 9	2,747	2,574	— 173	19	52,490	— 4,039
Liverpool Overhead.....	" 10	1,714	1,633	— 81	19	31,473	+ 1,013
London Electric.....	" 9	13,920	13,995	+ 75	19	274,415	+ 380
Mersey	" 9	2,352	2,314	— 38	19	42,966	+ 114
Metropolitan	" 10	16,920	17,773	+ 853	19	339,737	+ 29,244
Metropolitan District.	" 9	13,038	12,907	— 131	19	249,975	+ 293

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TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, May 15.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	69½ — 71½
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref	...	4½ — 4⅝
5	Do. 5½% Cum. 2nd Pref.	...	4⅛ — 4⅜
100	Do. 4% Deb. Stk. Red.	— ½	92 — 94
100	Do. 4½% Deb. Stk. Red.	...	98¾ — 101¼
100	Do. 5% Deb. Stk. Red.	...	96½ — 98½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 —106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅝ — ¾
1	Do. 5% Cum. Pref	...	⅛ — ¼
100	Do. 4½% 1st. Mort. Deb. Stock, Red.	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	...	86 — 87
10	Blackpool and Fleetwood Tramroad Co.	...	14 — 15
	Bombay Elec. Supply and Trams. Co., Ord.	...	14 — 15
10	Do. do. 6% Cum. Pref.	...	10¾ — 11¼
100	Do. do. 4½% Db. Stk Rd.	...	94½ — 96½
$100	Brazilian Traction Light and Power Co. Lim.	+ 1	78 — 80
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	...	7⅛ — 8
5	Do. do. 5% Cum. Pref	...	4⅛ — 5⅜
100	Do. do. 4½% 1st Deb Stock, Red.	...	98 —101
10	Bristol Tramways and Carriage Co.	...	6¾ — 7
10	Do. do. 4% Cum. Pref.	...	6⅞ — 7⅛
100	Do. do. 4% Deb. Stock	...	100 —103
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	...	111 —115
100	Do. Pref. Ord. Stock	...	104 —108
100	Do. 5% Cum. Perpetual Pref. Stock.	...	102 —105
100	Do. 4½% 1st Mort. Debs.	...	96 — 99
40	Do. 4½% Vancouver Power Debs.	...	94 — 98
100	Do. 4½% Perpetual Cons. Deb. Stk.	...	93½ — 96½
100	British Elec. Traction Co., Lim., 6% Cum. Pref.	...	88 — 91
100	Do. 7% Non-Cum. Pref.	— 1	55 — 58
10	Do. 6% Pref. Ord. Non-Cum.	— ½	14¼ — 15½
100	Do. Deferred Ord. Stock	— ⅛	5½ — 7½
100	Do. 5% Perpetual Debenture Stock.	...	92 — 94
100	Do. 4½% Second Debenture Stock, Red	...	77 — 80
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	73 — 78
100	Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb.	...	99½ —101¾
5	Calcutta Tramways Co., Limited. Ord.	— 1/16	6¼ — 7
5	Do do. 5% Cum. Pref.	...	5 — 5¼
100	Do. do. 4½% 1st Deb. Stock, Red.	...	97 —100
1	Cape Electric Tramways, Ld.,	...	⅝ — ¾
10	Carthagena and Herrerias Steam Tramways Co., Lim.	— ¼	2¾ — 3½
100	Do. 5% Debs., Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co. (1904), Lim.	— 1/16	5⅛ — 5⅜
100	Do. 4% Debenture Stock Red, 1935	+ 1	92 — 97
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.	...	88 — 92
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	...	89 — 92
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	— 6⅞
10	Dublin United Trams. Co. (1896) Lim. Ord.	— 1/16	— 10⅜
10	Do. do. 6% Pref.	— 1/16	— 12½
100	Do. do. "A" Red.	...	— 80¼
100	Do. do. Deb. Stock "B" Red.	...	— 80 xd
10	Gateshead & Dist Trys. Co., Ord.	...	8½ — 9
10/-	Hastings & Dist. Electric Trams. Co., Ltd., Ord.	...	3/16 — 5/16
1	Do. do. 6% Cum. Pref.	— 1/32	3/32 — 5/32
100	Do. do 4½% Deb. Stk. Red.	...	65 — 70
100	Havana Electric Railway, Con. Mort. 5% Bonds	...	93½ — 97½
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)	...	86 — 90
10	Imperial Tramways, Ord.	...	3 — 3¼
10	Do. do. 6% Cum. Pref.	...	6¼ — 6¾
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.	...	2 — 2½
100	Do. 4% Debenture Stock	...	73 — 78
1	Kalgoorlie Elec. Trams., Ltd.	...	...
100	Do. do. 5% "A" Deb. Stk.	...	84 — 89
100	Do. do. 6% "B" do.	...	10 — 20
	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.	...	3/32 — 5/32
7/6	Lanarkshire Tramways Co.	...	9¾ — 10¾
10	Lancashire United Tramways, 5% Prior Lien Deb.	...	87 — 89
100	Lisbon Electric Trams., Lim., Ord.	— 3/32	1 3/32 — 1 5/32 xd
1	Do. 6% Cum. Pref.	...	1 3/16 — 1 5/16
100	Do. 5% Mort. Debs.	...	95 —100
1	London and Suburban Trac. Co., Lim., Ord.	...	1/16 — 3/32
100	London General Omnibus Company, Limited, 4½% Deb.	+ ½	99 —101
100	Do. Do. 5% Cum. Inc. Deb. Stk. Red.	...	89 — 92
100	London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red	...	56 — 60
100	Madras Electric Trams. (1904) Lim., 6% Cum. Pref.	...	4⅞ — 5¼
5	Do. do. 5% Deb. Stk., Red.	...	101 —103
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	78 — 81
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	...	105 —108
$1,000	Do. do. 5% Bds.	...	99½ —100¼
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	1 1/16 — 1 3/16
100	Metropolitan Elec. Trms. Ltd., 4½% Deb Stock, Red.	...	87 — 90
100	Do. 5% Deb. Stock, Red.	...	85½ — 88½
100	Mexico Tramways Co., Common Stock	...	63 — 65
500	Do. Gen. Con. 1st Mort. Gld. Bonds	+ 1	77 — 81
100	Do. 6% 50-yr. Mort. Bonds	+ 1	78 — 78
...	Michigan United Railways 5% 1st Mort. Gld. Bonds	...	90 — 93
100	Montreal Street Railway, Sterling 4½% Debs. (1922)	...	98 —100
100	Do. 4½% Sterling Debs, (1922)	...	97 — 99
1	National Steam Car Co. Ltd.	+ 3/32	3/4 — 7/8
10	Oldham—Ashton and Hyde Elec. Ord.	...	6 — 6½
10	Do. do. 5% Cum. Pref.	...	5¾ — 6⅛
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	3¾ — 4⅜
5	Do. do. 6% Cum. Pref.	...	4 — 4½
1	Perth (W.A.) Elec. Trams., Ld., Ord.	...	—
1	Potteries Electric Traction Co., Ltd., Ord.	...	13/16 — 7/8
1	Do. 5% Cum. Pref.	...	13/16 — 7/8
130	Do. 4½% Debenture Stock, Red.	— 2¼	81¾ — 84¾ xd
1	Provincial Tramways, Lim., Ord.	...	13/16 — 7/8
10	Do. 5% 1st Deb. Stock	...	96 —103
...	Puebla Tramway, Light & Power Co., Prior Lien 5%	...	78 — 78
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.	...	5 — 5¼
100	Do. do. 4½% 1st Mt. Db. Stk	...	95 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	87 — 89
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	+ ½	95 — 97
100	Do. do. 5% 50-yr. Mort. Gold Bonds	— 1	87 — 89
100	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	...	96 —100
$500	Do. 5% 1st Mort. Debs., Red., 1929	...	96 — 99
10	Shanghai Elec. Construction Co.	...	13¾ — 13¾
100	Singapore Elec. Tramways Lim., 5% Debs. Red	...	88 — 92
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref.	...	...
100	Do. do. 4% Deb. Stk.	...	66 — 70
...	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	95 — 97
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	97 — 99
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	83 — 84
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	90 — 92
5	United Elec. Tramways of Monte Video, Ord.	...	4⅝ — 5⅛
5	Do. do. 6% Cum. Pref.	...	4⅞ — 5⅛
100	Do. do. 5% 1st Deb. Stk. Red.	...	92½ — 95½
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	93¾ — 95¾
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	1/16 — 3/16
5	Do. do. 6% Cum. Pref.	...	4¾ — 4¾
100	Do. do. 4½% 1st Deb. Stock. Red.	...	84 — 87

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

BOMBAY, BARODA, AND CENTRAL INDIA RAILWAY.

The Directors are prepared to receive up to noon on Tuesday, June 2, tenders for the supply of :—

CLASS A.

1. Metals.

CLASS B.

1. Spring and Ferrule Steel.
2. Bolts, Nuts, Rivets, etc.
3. Wood Screws, Nails, Pins, etc.

Tenders must be made on forms, copies of which, with specifications, can be obtained at these offices on payment as follows :—For Class A 20s. each, and for Class B 10s. each (which will not be returned).

The Directors do not bind themselves to accept the lowest or any tender.

C. CROMMELIN,
Secretary.

Offices : Gloucester House,
110, Bishopsgate, London, E.C.

URBAN DISTRICT COUNCIL OF DARTFORD.

EXTENSION OF ELECTRICITY WORKS.

The Council hereby invite tenders from steam turbine makers for the supply, delivery, and erection of the following plant :—

One 500 kw. High-pressure Steam Turbine, direct coupled to a Three-phase Alternating Current Generater, together with Surface Condenser, Pumps, Air Filter, Transformer, etc.

Only complete tenders will be considered.

Copies of specification and form of tender may be obtained at the Offices of the undersigned on and after May 25, 1914, on depositing a cheque for two guineas, which sum will be returned on receipt of a *bonâ-fide* tender.

Further information can be obtained on application to Mr. J. D. Pember, the Electrical Engineer, at the Electricity Works, Dartford.

Tenders, sealed and endorsed "Tenders for Extensions at Electricity Works," to be addressed to me and delivered by 12 o'clock noon on Monday, June 15, 1914.

The Council do not bind themselves to accept the lowest or any tender.

W. KAY,
Clerk to the Council.

Council Offices, Dartford,
May 20, 1914.

LONDON—INDIA OFFICE.

The Secretary of State for India in Council is prepared to receive tenders from such persons as may be willing to supply—

Wheels and Axles.

The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at that Office by 2 o'clock p.m. on Wednesday, June 3, 1914, after which time no tender will be received.

H. J. W. FRY,
Director-General of Stores.

India Office, Whitehall,
May 25, 1914.

CITY OF AUCKLAND, NEW ZEALAND.

ELECTRICITY DEPARTMENT.

Separate tenders, endorsed "Tender for Power Station Plant, No. ," will be received in the Town Clerk's Office, Auckland, N.Z., up till 4 o'clock p.m. on Thursday, August 6, 1914, for the supply and erection in the City Council Power Station, Auckland, N.Z., of—

Contract V. Three 750 kw. d.c. Mixed Pressure Turbo Generators.

Contract VI. One 1,500 kw. 3-phase Turbo Generator, including Auxiliary Plant and Sub-Station Equipment.

Specifications and drawings may be obtained from Messrs. Preece, Cardew and Snell. 8, Queen Anne's Gate, London, S.W., on payment of a deposit of £2, which will be refunded on receipt of a *bonâ-fide* tender.

The City Council do not bind themselves to accept the lowest or any tender.

HENRY W. WILSON,
Town Clerk.

April 6, 1914.

BOROUGH OF DARLINGTON.

ELECTRICITY DEPARTMENT.

The Darlington Corporation are prepared to receive tenders for the supply and erection of the following :—

One Water-tube Boiler.
One Cooling Tower.

Copies of the specifications and conditions may be obtained on application to the borough electrical engineer, Electricity Works, Haughton Road, Darlington, accompanied by a deposit of £1 1s., which will be returned on receipt of a *bonâ-fide* tender.

Sealed tenders, endorsed "Tender for Electrical Plant," to be delivered to the undersigned not later than June 4, 1914.

HY. G. STEAVENSON,
Town Clerk.

Town Clerk's Office, Darlington,
May 9, 1914.

BOROUGH OF HAMPSTEAD.

TENDERS FOR TURBINE, CONDENSING PLANT, ETC.

The Council of this Borough invite tenders for the supply, delivery, and erection of :—

(1) One 1,500 kw. Turbo Alternator.
(2) Barometric Jet Condenser and Pipework.
(3) Cooling Tower and Tanks.

Copies of the specification, formal conditions, etc., may be obtained upon application to the Chief Engineer and Manager, Electricity Works, Lithos Road, Finchley Road, N.W., on payment of two guineas, which will be returned on receipt of a *bonâ-fide* tender.

Tenders sealed and endorsed on the outside "Tenders for Extension of Electricity Works Plant," to be addressed to the Town Clerk, Town Hall, Haverstock Hill, N.W., and delivered not later than 10 a.m. on Thursday, June 11 next.

(By order) ARTHUR P. JOHNSON,
Town Clerk.

Town Hall, Haverstock Hill,
May 19, 1914.

SALFORD CORPORATION TRAMWAYS.

Tenders invited by 3 p.m. on Monday, June 15, 1914, for 24 Car Bodies; also for Trucks, Motors, Controllers, etc., for same.

For further particulars send stamped addressed envelope to the General Manager, 32, Blackfriars Street, Salford.

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CITY OF MELBOURNE, AUSTRALIA.

SUPPLY OF TUBULAR STEEL TRAMWAY POLES.

Tenders are invited for the supply of 60 Tubular Steel Tramway Poles.

Copies of specification, conditions of tender and of contract, and form of tender can be obtained on application to the undersigned.

Such application must be accompanied by a deposit of 5s., which will be returned on receipt of a *bonâ-fide* tender.

Tenders to be sent to the undersigned, endorsed "Tubular Steel Tramway Poles," and must be received by them not later than 12 noon on Wednesday, June 3, 1914.

The Council reserves to itself the right, but does not bind itself, to accept the whole or any portion of any tender.

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POSITION WANTED.

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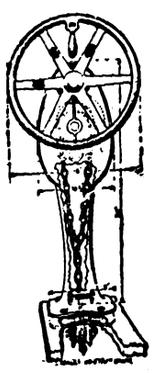

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THE
Tramway AND Railway World

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SATURDAY, MAY 23 1914.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

FARE QUESTIONS AT BIRMINGHAM AND BRADFORD.

Birmingham and Bradford have dealt with suggestions for reduction of fares in a manner that indicates reliance on the advice of the managers. In 1912, when Birmingham took over the whole of the tramways, reductions in fares were made which have lowered the receipts from 11.054d. to 10.492d. per car mile. Taking workmen's fares into consideration the scale, Mr. Alfred Baker says, is the cheapest in the country. A diagram is attached to the report which he recently submitted to the tramway committee showing the average length of penny stages on 69 systems. Birmingham is placed third, with an average stage of over 2¼ miles, Liverpool being first with nearly 2½ miles, and Manchester second, while Leeds and London are both under two miles. In support of his recommendation against halfpenny fares, Mr. Baker gave information from twenty towns. Glasgow, he reminds us, has no workmen's fares, while it has a density of 60.4 persons to the acre, as against 19.18 in the Midland city. It might be profitable, Mr. Baker adds, to institute short halfpenny fares if workmen's cheap returns were withdrawn, as 77 per cent. of the passengers never travel by workmen's cars. A diagram is given to show that the penny fare is the backbone of the system, the receipts from that source in 1912-13 amounting to £360,095, as against £61,215 from fares of three-halfpence, and £54,903 from twopenny fares. A census taken of the distance travelled by passengers on the penny stages shows that 42 per cent. rode less than half the length of the stage, therefore Mr. Baker estimates that to divide the penny stages into halfpenny stages would reduce the receipts upwards of £90,000. To recover the loss 43,000,000 passengers would be required as well as extra cars and car sheds. In the Birmingham manager's opinion halfpenny stages on the Glasgow method would render the undertaking a charge on the rates. Equally strong is the reason advanced in opposition to the suggestion that the hours of workmen's cars should be extended from 8 to 9 a.m. Already workmen are carried at less than cost, and an extension of an hour would have reduced the revenue in 1912-13 by £23,750. With operating costs increasing each year, Mr. Baker has justification for warning the Council that if further concessions are granted it will not be long before the fractional profits per passenger are wiped out. Bradford Council have decided to avoid any policy which would aggravate the overcrowding difficulty at the rush hours, or lead to the depletion of profits and reserve funds, so that it would not be possible to renew the cars and the track. This is becoming a more serious burden as the cost is being increased now by the growth of heavy motor traffic. Mr. C. J. Spencer, the manager, observes that the department is unfairly held responsible for practically two-thirds of the surface of almost all the main roads. Bradford is in the peculiar position of having one-way tickets at half the ordinary rate up till 9 a.m., the return journey being paid for at the full rate. It was proposed to allow these ticket-holders to return at half fare in the evening also. This step would have more than wiped out the profit of about one-seventh of a penny per passenger now made on the undertaking. Mr. Spencer is, however, prepared to advise a continuance of the policy of extending the distance allowed for a fare of a penny, provided that there are no halfpenny fares and no workmen's fares. Faced by the barrier of Mr. Spencer's report the Labour party invited the Council to decree that the sum of £10,000 proposed to be taken for the relief of the rates should not be so appropriated, and that no further profits be taken until workmen's return fares have been granted. Several interesting considerations arise from such a proposal, but the Council decided against it by forty votes to nineteen. It would be interesting to learn why the Committee do not give consideration to the suggestion to which Councillor J. Hill, a former chairman, now chairman of the Finance Committee, remains faithful, viz., the institution of a penny universal fare from the centre to any point within the city.

A NEW DANGER TO LONDON TRAMWAYS.

The disinclination of the Government to carry out the manifest duty of establishing a Traffic Board for London has already entailed serious consequences. Confusion and danger constantly increase, but no real effort is made to grapple with a situation which the public welfare requires should be dealt with carefully and with full knowledge and authority. Without an expert traffic body, unprejudiced and concerned only to secure the fullest public advantage, nothing will or can be done. Yet the Government recognise that while they temporise some apparent effort must be made to improve the conditions. The latest suggestion emanates from the Home Secretary, who, as reported in another column, has allowed the Chief Commissioner of Police to inquire of the tramway authorities whether they will submit their time tables to him for approval. The reply, we understand, has been a firm refusal. Tramways are constructed under statutory authority and are subjected to the control of the Board of Trade, who have on the whole carried out their duties in this direction with fairness and discretion, and they require no assistance from the Police Department. That department has always shown hostility

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to tramways. No progress has ever been made in London without long and strenuous effort to overcome the influence of Scotland Yard. The view of the department always has been that tramways are a nuisance and that their advantages should be curtailed in every way possible. Consequently access to the Embankment was opposed time and again. More recently the Police Department delayed the use of trail cars, which had their opinion been allowed to prevail would not yet have been permitted. Moreover, when there is any question between tramways and omnibuses the latter for some reason are given the preference. At the time of the Coronation, for instance, while tramway traffic across the bridges was stopped by the Police regulations almost all day, motor omnibuses were allowed to run freely with the exception of a few hours. There was no justification for this unfair preference. As regards speed, again, the Police have always held, in spite of statistics which prove the contrary, that motor cars may safely be allowed to run at higher speeds than tramway cars. Sir Edward Henry, giving evidence as Chief Commissioner of Police before the Select Committee on Motor Traffic in January, 1913, while expressing the opinion that motor cars should be allowed to travel at 20 miles per hour, desired to limit the speed of tramway cars to 12 miles, although the Board of Trade in numerous instances have sanctioned a maximum speed of 16 miles. Sir Edward then put forward the suggestion that the time tables of the journeys of all stage carriages should be approved by the Commissioner of Police. If such authority were granted over tramways the result would be, no doubt, that motor omnibuses would be allowed shorter times for journeys, while the speed of tramcars would be curtailed further than is necessary or desirable. Tramway authorities will in present circumstances be well advised not to consent to any enlargement of the control of the Police Department, but to continue to press for the appointment of an unprejudiced and expert Traffic Board for the whole of the Metropolitan area.

PRIVATE BILL LEGISLATION.

Manchester Corporation.—A House of Lords' Committee have passed this Bill, and it has been ordered for third reading. The powers applied for include the provision and running of omnibuses, an extension of the time for the construction of certain tramways, and the erection of a generating station at a cost of £1,200,000. At the suggestion of the Committee a clause was included under which it would be necessary for the Corporation to obtain consent, upon terms, from the county and local authorities outside the city boundaries before starting a service of omnibuses in outside areas.

Leeds Corporation.—When the Earl of Plymouth's Committee of the House of Lords resumed consideration of this Bill on May 14, providing for powers to extend the railless trolley car and tramway routes, Mr. J. P. Hamilton, the general manager of the Corporation tramways, said that to lay tramways would be too expensive, but a system of trackless trolley cars to Otley and Burley would, he estimated, give a net profit of £419. The Corporation would not interfere with the statutory powers of the Electric Power Company.—In cross-examination by Mr. T. Jones (for the West Riding County Council), Mr. Hamilton said that his estimate for the railless trolley proposed included ⅜d. per car mile, realising £298, as a contribution for road maintenance. He had not done this, he said, because he admitted the principle, but because in recent decisions of Parliamentary Committees such contributions had been enforced, and he wanted to be on the safe side. About half the road in question was water-bound macadam, but it was thoroughly satisfactory for that kind of traffic. He thought, however, that the road would be better if made of tar macadam. At present these roads carried a great deal of heavy motor traffic. He contended that the Corporation ought not to be called upon to contribute anything towards road reconstruction.—Evidence in support was given by representatives of three local authorities, and on May 15 Mr. C. J. Spencer, manager of Bradford Corporation tramways, and Alderman R. A. Smithson, chairman, Leeds Tramways Committee, supported the case for the Corporation.—On behalf of the Midland and North Eastern Railways, Mr. Talbot, on May 18, asked the Committee not to sanction the Corporation running, without any road maintenance contribution, a competitive service over roads which the companies had to assist in keeping up; and Mr. F. Tatlow, chief assistant to the general manager of the Midland Railway, said the traffic did not justify the provision of increased facilities by the company. Mr. Ram, K.C., on behalf of the West Riding Council, asked the Committee to impose the usual conditions, and the Committee allowed the Bill to proceed under the following conditions:—The Corporation to pay .375 of a penny per car mile; there is to be an arbitration clause put into operation at the instance of either party at the end of three years as to future rates; the Corporation to make no contribution towards capital expenditure on widening or reconstructing the roads, the railway companies to be governed by this decision as regards their roads; the Corporation to be at liberty to supply electric energy for the sole purpose of the trackless trolley system on the proposed route.

Newcastle-on-Tyne Corporation.—The Standing Orders Committee had allowed a provision for the running of motor omnibuses in the urban district of Longheaton to be included in the Newcastle Corporation Bill now before Parliament, although the application was opposed by Gosforth Urban Council and the North Eastern Railway Company. The motor omnibus clause was considered by the Lords' Standing Orders Committee on May 19, when they decided not to dispense with the Standing Orders, thus preventing the new clause from being proceeded with. Objection to the clause was raised by Gosforth Urban Council and the Tyneside Tramways Company.

Chesterfield Corporation.—This Bill on May 19 passed the Lords' Committee on Unopposed Measures, and was sent for third reading in the House of Lords prior to receiving Royal Assent.

Birkenhead Corporation.—When this Bill to permit of the Council running omnibuses in the borough and in certain adjoining districts came before a House of Lords' Committee on May 14, the Committee suggested that the Corporation representatives might consider whether they would be prepared to agree to the inclusion of a clause similar to that agreed upon in the recent Manchester Bill, under which it would be necessary for the Corporation to obtain consent, upon terms, from the county and local authorities outside the present Birkenhead boundaries before starting a service of motor omnibuses in the outside areas. A suggestion had been made by counsel for Cheshire County Council and three District Councils that the desired clause should operate so that the consenting authorities could require the Corporation to contribute to preparing the roads for the traffic, including widening, and to the expense of maintenance.—On May 15 Mr. Solly, chairman of Birkenhead Parliamentary Committee, said the Corporation would be willing to make a contribution, as had been agreed in other towns, of 3-8ths of a penny per car mile.—Mr. Wedderburn said the view of Wirral Rural Council was that it was impossible to start any service on some roads without something being done to the surface and widenings being carried out.—Mr. Solly: I submit you are wrong, because at the present time a very considerable number of chars-a-bancs are running, and they cut up the roads as much as our 'buses would do.—The Chairman: Your 'buses would be an additional load on the road?—Yes, and also we are prepared to pay a contribution of 3-8ths of a penny per car mile.—After further discussion the Committee decided that the circumstances in this case differed from those of Manchester, and therefore they were not prepared to grant the Manchester clause here.—Mr. C. Clarke, the tramways manager, said a census showed that a great amount of heavy mechanically-propelled traffic passed over the routes. He estimated there would be a profit on each route.—Replying to a suggestion by Mr. Wedderburn that if the Corporation paid ½d. per car mile, the road authorities not being inclined to accept ⅜d., the estimated profit would be wiped out, witness said that even if there was a loss it would be more than covered by the feeding which the omnibuses would give to the tramways.—On May 15, Mr. A. R. Fearnley, formerly tramway manager at Birkenhead, speaking from experience in Sheffield, expressed the opinion that the proposed services could be satisfactorily worked in connection with the tramways, that they would be largely used, and that the roads were suitable. If a contribution had to be given towards the cost of roads, ⅜d. per mile was sufficient.—Evidence was given on May 18 by the Birkenhead borough surveyor that the county roads should be tar-macadamised. The town roads over which the vehicles would travel were water-bound macadam, tar-sprayed annually, and were suitable for the proposed traffic. The offer of ⅜d. per omnibus mile was sufficient. Cross-examined, he admitted that in 1906, when opposing the Mersey Railway Company's omnibuses he said it took £20,000 to lay two miles of paved road. Such an expenditure would not be necessary in the case of the county roads. Evidence in opposition to the Bill was given by representatives of the London and North Western Railway, Wirral Railway, and the Committee adjourned.

Glasgow Corporation.—The hearing of this Bill began before Lord Ribblesdale's Committee on May 15. Powers were asked for to construct 28 different tramways in and near Glasgow. Of these 15 would be within the city, nine outside, and four partly in and partly outside the city. It was also proposed to build two bridges over the Clyde and the Kelvin, and to run tramways over each. The main opposition was to a tramway for University Avenue, on the ground that it would subject to disturbance the experimental work in the University laboratories. In disproof of this suggestion evidence was given that a tramway had been allowed to be constructed past Kew Observatory without any injury to the scientific instruments there. Mr. J. Dalrymple, who for nine years has been general manager of the Glasgow tramways, in the course of his evidence stated that the Corporation had 197 miles of track measured as single, 149 within the city and 48 miles outside the boundaries. They had 841 cars, and were building 159 additional cars. The traffic revenue last year was over £1,000,000. At present they carried 337 million passengers per annum. Four years ago they were only carrying 222 million per annum. For the

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University three professors gave evidence of the injurious effects of vibration on their experimental work, and one said if the Committee ordered the Berlin precautions to be taken it would reduce his opposition. Mr. Stephen Sellon gave evidence that he did not see any public case for the construction of this tramway. Kew Observatory authorities had received £10,000 from the London United Tramways Company to settle their complaints, and had removed many of their delicate instruments to Eskdalemuir in Scotland, but there were still complaints from the Observatory of disturbance. The London County Council were obliged to provide insulated returns on all their tramways within three miles of Greenwich Observatory. Professor Boys and other witnesses having been heard, the Committee decided against the University Avenue line, and adjourned consideration of the remainder of the Bill to June 9.

OXFORD AND DISTRICT TRAMWAYS BILL.—The Examiner of Private Bills has sent this measure forward for consideration in Committee. The Bill asks for powers to enable the Tramways Company and the Corporation to carry into effect agreements to buy up and remove the company's horse tramways, to substitute a service of motor omnibuses, and to extend the time for the possible construction of tramways.

BRISTOL AND TRAMWAYS PURCHASE.

Next Tuesday Bristol Corporation will meet to consider a report presented by the Tramways Option Committee recommending the Council to accept the Tramways Bill as amended by the House of Lords' Committee, subject to a poll of the city being favourable to the acquisition of the Bristol Tramways Company's undertaking. The committee also recommend that the Council should proceed at once to ascertain the opinion of the parochial electors on the question of purchase. These recommendations are based on a report received from Messrs. J. B. Hamilton and J. H. Snell, who give the estimated value of the portion of the undertaking purchasable in 1915 as £600,000. On that basis they estimate a net annual profit of £37,000. It may be remarked that the total capital of the company is £1,700,000.

In considering tramways versus other forms of street transit the report expresses the opinion that "an insuperable disadvantage from the financial point of view results from the limitation of the size" of the motor omnibus; the seating capacity of the tramcars in Bristol is an average of 52 passengers, whilst the motor omnibus in many cases only has accommodation for 18, so even if they had a capacity of 26 passengers there must be two motor omnibuses to afford the same carrying capacity as one tramcar would at the present time. The total cost of operating a tramcar in Bristol, including interest, sinking fund, etc., is at least 1 3-5d. per mile less than that for a motor omnibus. On the assumption that the maximum demand for conveyance occurs for 20 per cent. of the period during which the vehicles run, and that at other times the omnibus of 26 capacity would attract and convey as many passengers as a tramcar of 52, the difference in total cost in the provision of a motor omnibus service, as compared to a tramway service, on the estimate of 1915 would be £78,376 more for motor omnibuses than for tramways. So far as the motor omnibuses running in Bristol are concerned, a careful census of the routes showed that the average earnings on the omnibus routes were only 6.64d. per mile. A second census gave the average revenue as 8.89d., but this figure "would not materially affect" the surplus per annum of £37,073, since the actual revenue obtained by the company, after making allowance for abnormal traffic at or about the period of the Royal Agricultural Show, was considerably in excess of that estimate.

The report considers the length of the stages from the centre to the end of the first 1d. stage rather short, and that a reduction of these fares to get into line with those of many towns, viz., about two miles for 1d., with the addition of a more frequent service, would lead to a very considerable increase in travel and of revenue. An examination of the returns of all towns from 200,000 inhabitants upwards shows their populations for the year 1912 were carried 170 times, whilst in Bristol the average was only 145. As the average fare per passenger is 1.05d., the difference in returns if Bristol should rise to the above average would be an increase in revenue of £39,484. Messrs. Hamilton and Snell feel convinced that an Arbitration Award would lie somewhere about their estimate of £600,000 as the value of the undertaking, and that it will be absolutely safe on this valuation to base all deductions as to the cost of working the tramways by the Corporation. This £600,000 includes the value of the lines, just over £40,000, which, prior to the House of Lords' decision, were not purchasable in 1915, some three odd miles.

Mr. J. M. McElroy, after studying the report of Messrs. Hamilton and Snell, states that the present fares are exceptionally high, and he has "no hesitation in strongly recommending the Corporation to purchase and work the tramways undertaking themselves, knowing that they will be able to provide better and cheaper transit facilities than exist at the present time, and that substantial profits will accrue to the city to be used either in the further development of the undertaking or to be paid over in aid of the city rate, as is done in the case of many of the larger tramway undertakings in the kingdom." He states that omnibuses are destined to play an important part as a means of transit for urban and suburban passenger transport in thinly populated districts, but as the result of his tour last year in the United States, Canada, the Continent, and the United Kingdom he could not too strongly emphasise the inability of the motor omnibus to handle the heavy traffic properly at the rush hours.

THE I.M.E.A. CONVENTION.

The annual Convention of the Incorporated Municipal Electrical Association will be held at Birmingham from June 15 to 20, under the presidency of Mr. R. A. Chattock, chief electrical engineer of Birmingham. Vouchers for railway tickets, which will entitle the holder to reduced return fares from June 12 to June 23, can be obtained from Mr. McArthur Butler, 28, Bedford Square, London, W.C. Application for vouchers and other tickets must be made not later than June 8. The headquarters will be the Grand Hotel, Colmore Row. An elaborate programme has been arranged of which a summary is appended :—

MONDAY, JUNE, 15.

8 p.m.—Informal reception and smoking concert at the Grand Hotel.

TUESDAY, JUNE 16.

10 a.m.—Opening of the Convention at the Large Theatre, Midland Institute; official welcome by the Rt. Hon. the Lord Mayor, Lieut.-Col. Ernest Martineau.

Address by Mr. R. A. Chattock, President of the Association.

Paper on "The Commercial Development of Electrical Supply in Towns of Moderate Size," by Mr. W. A. Vignoles.

1 p.m.—Luncheon at Grand Hotel (Grosvenor Room), by invitation of the Birmingham Entertainments Committee.

2.30 p.m.—Conveyances leave the Grand Hotel for visits to the works of the General Electric Company, Ltd., at Witton. There will be a demonstration of electrical vehicles outside the G.E.C. Works at Witton, organised by the Electric Vehicle Committee of the Association. The party will afterwards proceed to the works of Messrs. Belliss and Morcom, Ltd., Birmingham. The Corporation Electric Generating Station, Summer Lane, will also be open for inspection.

7 p.m.—Annual dinner at the Grand Hotel (Grosvenor Room), members, delegates, ladies, and visitors.

WEDNESDAY, JUNE 17 (COVENTRY).

9.15 a.m.—Special train (first class only) leaves New Street Station, Birmingham, due at Coventry 9.40 a.m.

10 a.m.—Meeting at St. Mary's Hall; official welcome by his Worship the Mayor, Councillor S. Bettmann, J.P.

Paper on "The Design and Operation of Modern Boiler House Plant," by Mr. S. E. Fedden, Past President.

1 p.m.—Luncheon at the Drill Hall, Queen Victoria Road, by invitation of the Mayor.

2.30 p.m.—Visits to Coventry Corporation Electricity Works and the Daimler Company's works. The following works will also be open for inspection :—Coventry Ordnance, Triumph Motor Cycle Works, Coventry Chain Company, B.T.H. Company's Meter Works. The British Thomson-Houston Company's and Messrs. Willans and Robinson, Rugby, will convey any members who desire to see their works to Rugby and back to Coventry during the afternoon.

5.35 p.m.—Special train leaves Coventry, due at Birmingham 6.10 p.m.

8.30 p.m. (Birmingham), reception and dance by invitation of the Lord Mayor and Lady Mayoress (Lieut.-Col. and Mrs. Ernest Martineau), at the Council House, Birmingham.

THURSDAY, JUNE 18 (STRATFORD-UPON-AVON AND WARWICK)

9 a.m.—Motor vehicles leave the Grand Hotel, Birmingham, for Stratford-upon-Avon.

10.30 a.m.—Meeting at the Memorial Lecture Room, Waterside, Stratford-upon-Avon; official welcome by his Worship the Mayor, Councillor F. Winter, J.P.

Paper on "The Standardisation of Tariffs," by Mr. J. Horace Bowden.

1 p.m.—Luncheon at the Town Hall.

2.30 p.m.—Motor Vehicles leave Bridge Street for Warwick, where a stop will be made to inspect the Castle and Grounds.

5 p.m.—Motor vehicles leave the Castle for Birmingham via Kenilworth, where the party will be able to see the ruins as they drive past.

8.30 p.m. (Birmingham), conveyances leave the Grand, Midland, and Queen's Hotels for an open-air fete and concert in the grounds of the Botanical Gardens, Edgbaston, by the invitation of the Birmingham Entertainments Committee.

FRIDAY, JUNE 19 (BIRMINGHAM).

9.30 p.m.—Council Meeting at the office of the Secretary of the Midland Institute.

10 a.m.—Annual general meeting at the Large Theatre of the Midland Institute.

1 p.m.—Luncheon interval.

2.30 p.m.—Visit to the Corporation Electric Generating Station, Summer Lane. Light refreshments will be provided.

8 p.m. Cinderella dance at the Grand Hotel (Grosvenor Room), by invitation of the Birmingham Entertainments Committee.

SATURDAY, JUNE 20 (WORCESTER).

8.40 a.m., ordinary train, first-class reserved accommodation, leaves New Street Station, due at Worcester (Shrubhill) at 9.40 a.m. 10 a.m., assemble at Guildhall; official welcome by his Worship the Mayor, Alderman H. A. Leicester. Alternative visits to the Royal Porcelain Works, the Cathedral, and the Commandery. 11.30 a.m., motor vehicles leave Edgar Street, for a visit to the Water Power Station, at Powick, to inspect the low pressure turbine. Light refreshments will be kindly provided by the Mayor, and afterwards the party will proceed by motor vehicles for a drive round the Malvern Hills. 2.30 p.m., luncheon at the Hop Market Hotel. 3.48 p.m., ordinary train, first-class reserved accommodation, leaves Shrubhill Station, due at New Street, Birmingham, at 4.45 p.m.

MUNICIPAL TRAMWAYS ASSOCIATION.

MEETING OF MANAGERS' SECTION.

The managers' section of the Municipal Tramways Association will hold its summer meeting at Plymouth on Thursday and Friday, June 11 and 12. The members will be welcomed by the Mayor of Plymouth, Councillor T. Baker, J.P., the chairman, Alderman S. H. Phillips, J.P., and members of the Plymouth Corporation Tramways Committee, in the Council Chamber at 10 a.m. on Thursday. Afterwards the following subjects will be submitted for discussion :—"Plymouth Corporation Tramways," by Mr. C. R. Everson, general manager of the Plymouth Corporation tramways; "Cost of Production of Electrical Energy for Traction Purposes," by Mr. J. F. Simpson, general manager of Preston Corporation tramways. On June 12, Mr. E. S. Rayner, general manager of Doncaster Corporation tramways, will introduce the subject of "Workmen's Return Tickets," and Mr. L. E. Harvey, general manager of Ilford District Council tramways, "Self-contained Electrically Equipped Vehicles." Arrangements have been made for a visit on Thursday afternoon to His Majesty's dockyard at Devonport, and on Friday afternoon a trip will be made by steamer up the Hamoaze, at the invitation of the chairman and members of the Plymouth Tramways Committee.

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LONDON TRAFFIC CONTROL.

In the House of Commons on Monday last, the 18th instant, Mr. McKenna, the Home Secretary, in replying to an inquiry from Mr. Kellaway (R., Bedford), as to which of the recommendations of the Select Committee on Street Traffic Accidents had been carried out, stated that the Commissioner of Police had taken active steps to secure the carrying out of those recommendations of the Select Committee affecting the safety of the public which could be dealt with under existing powers. He had been in constant communication with the borough councils as to the provision of new refuges, and 58 refuges had been put up during the present year. Additional police had been employed on traffic duty, and the question of stopping places for tramcars and omnibuses was now being dealt with as recommended in paragraphs 116 and 117 of the Committee's report.

The Home Secretary also stated that:—"Tramway authorities and managers of omnibus companies have been approached with a view to learning whether they are willing to submit their running time-tables to inspection."

We are informed that the whole of the tramways authorities in the Metropolitan area have unanimously decided not to comply with the request which has been made to them by the Commissioner of Police to submit their time-tables for inspection.

One of the grounds—among others—for arriving at the decision stated, is, we understand, that tramways are operated under statutory powers, and, as such, are therefore under the control of the Board of Trade.

MISCELLANEOUS NEWS AND NOTES.

Leeds Electrical Developments.—A Local Government Board inquiry was held on May 20 into an application by Leeds Corporation for sanction to borrow £200,000 for extensions of the generating station in Whitehall Road.

Goods Traffic.—A deputation from Liverpool Tramways Committee have been appointed to place before the Dock Board particulars of the scheme for the conveyance of goods from the Docks by tramway to the manufacturing districts.

The Peckham Truck and Engineering Company, Limited, has been organised to take over the business of the Peckham Truck Company, of Queen Anne's Chambers, Tothill Street, Westminster. The directors are Messrs. E. Peckham, G. Pauling, and H. W. S. Wills.

Manchester Car Numbers.—For several months tests of various types of numbers which can be illuminated at night have been made by the tramways department. All the cars on the various routes are now being numbered, the screen being placed under the destination box.

Railwaymen's Demands.—An eight hours day or a week of 48 hours, and an immediate increase of 5s. a week in every grade of the railway service comprise the demands which the National Union of Railwaymen have placed before the representatives of the various companies.

Oxford Tramway Difficulty Settled.—The City Council have adopted an agreement under which they will take up the horse tramways and restore the roads, and the Tramway Company in return will run motor omnibuses for a period of 37 years, and pay £800 a year to the Corporation.

Route Numbers at Glasgow.—Following experiments in respect to position and the style of numbers to be used, the Glasgow tramways department have begun to equip all the cars with route numbers above the top of the panel of the vestibules. The first route will be represented by 10, and there are about 70 services.

No Tax on Heavy Motor Vehicles.—In the House of Commons on May 15 the Home Secretary stated that the Government did not propose to impose a tax upon motor omnibuses and other heavy motor vehicles which caused expense to local authorities by breaking up the roads, but he said the whole subject was under consideration.

Omnibuses for Aberdeen Tramways Company.—At the end of May three omnibuses will be placed in service by Aberdeen Suburban Tramways Company. A new car, supplied by the United Electric Car Company, was inspected by the directors on May 18. It is of the vestibule type, and is furnished with cushions of calf leather in the saloon, which has oak panelling, while the roof is of bird's-eye maple.

Halfpenny Stages at Hull.—On the recommendation of the Tramways Committee halfpenny stages are to be tried experimentally for six months. Mr. W. J. McCoombe, the manager, considers the scheme to be a daring one, and the Mayor (Councillor Hargreaves) says that the undertaking has not a big margin to play upon, as the track costs £10,000 a year. The fares, the Mayor adds, will be the cheapest in the country. Transfers will not be issued after 9 a.m.

Preference for Remunerative Horse Cars.—Councillor C. W. Gorton has resigned his membership of Morecambe Tramways Committee as he does not agree with the Council being "rushed into the adoption of some scheme of traction, the profits from which might be problematical, when the horse cars were paying." He wished to be free to criticise the actions of the committee should occasion arise. At a meeting of the Council on May 18 Alderman Brown submitted the Tramway Committee's accounts for the year ended March 31, showing a net profit of £2,183. Of this £1,500 would be placed to the credit of the borough fund and £683 carried to the reserve.

Railway Competition with Birkenhead Tramways.—In consequence of the opening of a station at Port Sunlight, Lever Bros.' employees, whose tramcar fares are paid by the company, now travel in two special trains from and to Birkenhead. It is estimated that the new arrangement will result in a reduction of £2,000 in the tramway receipts, but that sum may be lessened owing to the general public now being able to secure seats in the cars, whereas formerly they generally had to stand.

Petrol Car Operation at Stirling.—In order to compete with motor vehicles the Stirling and Bridge of Allan Tramways Company last year introduced a petrol car on to their tramways, which are worked by horses. They intend to apply for a Provisional Order to authorise a permanent system of petrol cars over the whole of the tramways in the event of no agreement being arrived at by the several local authorities for an installation of an electric tramway system from Bridge of Allan to Bannockburn.

Proposed Simplification of Powers to Supply Transit Facilities.—Mr. H. Samuel, President of the Local Government Board, speaking on May 20 at a conference of delegates to the Victoria League Imperial Health Conference, said that the Board of Trade were now engaged in an inquiry in various typical cities into the question of transit facilities. The Government proposed, when that inquiry was complete, to set free by legislation the hands of local authorities to secure that the outskirts should be properly connected with the business portions of the towns, so that the housing could be spread out. Parliament would be asked to decide that town-planning should not be limited to those localities in which there happened to be an enlightened and progressive council. A further explanation of the inquiry was given by Mr. Samuel on May 14, when addressing the Sheffield Liberal Federation. He said that the proposals resulting from the inquiry would no doubt involve the enlarging and simplifying of the powers of local authorities to supply tramways and other means of locomotion.

Bonus for Birmingham Motormen.—By means of a bonus system to motormen the tramways department hopes to effect a considerable reduction in the amount of current consumed during the present year. Councillor Harrison Barrow, the chairman of the Tramways Committee, in moving the adoption of the annual report on May 19, informed the Council that if the cost per car mile had been the same as in the previous year there would have been a greatly increased profit. The traffic receipts were up about £54,600, and there was a small increase in the amount per car mile. In addition to increases in the cost of power and traffic expenses, the rates of the department were up £16,000 in consequence of the new assessment, and they had to pay £31,000 in rates in respect of the permanent way. Owing to the small number of persons to whom all-night cars would be an advantage the committee had decided not to institute such a service. Nor could they grant halfpenny fares and an extension of the time for the issue of workmen's tickets. By 50 votes to 35 the Council rejected an amendment to refer the report back to the committee with instructions to run workmen's cars until 8.30 a.m. instead of 8 a.m. An amendment in favour of halfpenny fares was also defeated.

CONTRACTS AND ORDERS.

General Electric Company have received a contract from Walthamstow Council for Osram drawn wire lamps.

F. Smith and Co. have received a contract from Ilford Urban Council for the supply of two miles of trolley wire, at 8½d. per lb.

C. A. Parsons and Co. have been awarded a contract to supply a 2,000 kw. turbo-alternator and condensing plant to Portsmouth Council, at £7,179.

Devonport Council have accepted the tenders of Jas. Howden and Co. for a 1,250 kw. Howden-Siemens turbo-alternator, and of Bruce Peebles and Co. for motor converters.

J. H. Tucker and Company, of Hay Mills, Birmingham, have received from Sunderland Corporation tramway department a contract for the supply over the next twelve months of their requirements in lampholders.

R.E.T. Construction Company, Limited, have received an order from Ramsbottom Urban Council for the supply of two railless trolley cars, complete with wheel guards and side guards, and wheels fitted to take 40in. diameter tyres; and for new wheels and springs for the old cars.

Prahran and Malvern Tramways Trust have placed a contract for the supply of points and crossings with Edgar Allen and Co., Limited, at £2,687, and for overhead materials and cables with the British Insulated and Helsby Cables, Limited, at £3,995 Tenders are to be invited for the supply of 25 cars.

Post Office Experimental Railway.—In connection with the scheme for the construction of an underground electric railway for the conveyance of mails in London, the Postmaster-General has placed the following contracts for an experimental line to be constructed at Woolwich:—Electric conductor rails and electric motor wagons, Dick, Kerr and Co., Limited.

The Motor Rail and Tramcar Company, Limited, have received an order from the South Indian Railway Company, Limited, for three "Simplex" rail coaches. Each coach will have seating capacity for 70 passengers, be 40ft. long over headstocks, and be propelled by a 45 horse-power motor in conjunction with a "Dixon-Abbott" gear box affording three speeds in both directions, operated from either platform. These coaches are capable of a speed of 25 miles per hour.

The Railway Track Supply Company, of 79½, Gracechurch Street, London, E.C., have received an order from the Great Western Rail-

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way Company for six "Edison-Buckwalter" electric trucks. This is the fourth order placed by this railway for "Buckwalter" trucks since September last. We understand the Great Western Railway intend to employ the trucks just ordered for railway platform service. "Edison-Buckwalter" trucks are now being used for this purpose by a number of railway companies, etc., in this country.

Leeds Corporation have allotted the following contracts :—

Dick, Kerr and Co., Ltd., 100 controllers; Elliott Bros., one 10,000-ampere ammeter; Dick, Kerr and Co., Ltd., 10 electrical equipments for cars; British Thomson-Houston Co., 36 arc lamps; J. Brown and Sons, tyres; Taylor Bros. and Co., axles; Hadfield's Steel Foundry Co., points; Bayliss, Jones and Bayliss, Ltd., fish bolts; Bolckow, Vaughan and Co., fish plates; David Speight and Son, reconstruction of track; General Electric Co., Barr Bros., Thomson-Houston Co., Tramway Supplies, Ltd., Ruberoid Co., British Westinghouse Manufacturing Co., A. Thompson, L. Andrew and Co., Carl Quitman, Spicer Bros., Ltd., electrical supplies; Robert Kearsley and Co., Ltd., Ripon, and other firms, paints and varnishes.

PERSONAL.

Mr. C. Crossley has been appointed superintendent in the Chesterfield tramways department.

Mr. Henry Walker, of the Hawthorns, Castle Bromwich, has been appointed a member of the board of the Metropolitan Carriage, Wagon and Finance Company, Limited.

Mr. E. A. Mills, of the North Metropolitan Electric Power Supply Company, has been appointed assistant constructional engineer to Birmingham municipal electric supply department.

Mr. O. F. Francis, burgh electrical engineer, Kilmarnock, has been awarded an honorarium of £100 in recognition of his services in connection with the electric lighting extension order, and his salary has also been increased by £100 per annum.

Railway General Managers' Conference.—Sir Robert Turnbull has been elected a member of the Council of the Railway Companies' Association as successor to the late Sir Frank Ree. Mr. H. W. Thornton, as representative of the Great Eastern Railway, has succeeded Mr. W. H. Hyde, and Sir Robert Turnbull has succeeded Sir Frank Ree as representative of the London and North Western Railway.

FINANCIAL REPORTS AND MEETINGS.

British Electric Traction Company.—The directors, in their annual report, propose to add £50,000 to the reserve and to pay dividends of 6 per cent. on the 6 per cent. preference stock and 3½ per cent. on the 7 per cent. preference stock. A year ago 3 per cent. was paid on the 7 per cent. preference stock, and £40,000 was added to the reserve.

Hong Kong Tramway Company.—The net profits for 1913 were £10,508, after providing for debenture interest, and £7,127 was brought forward. A final dividend at the rate of 20 per cent. per annum, free of income-tax, is proposed, making 12½ per cent. for the year, and leaving to be carried forward £7,479. The Hong Kong Government contributed $15,248 further as compensation towards the company's losses during the boycott, making a total of $45,248, but there is still a considerable loss incurred on the Hong Kong (British) subsidiary coinage.

Satisfactory Results at Nottingham.—The revenue for 1913-14 amounted to £175,379, an average of 11.87d. per car mile. This is an increase of £8,218 and .37d. per mile. The working expenses amounted to £108,422 (an increase of £148 or 7.34d. per car mile as against 7.45d. the previous year), leaving a balance of £66,057, which has been disposed of as follows :—Interest on stock and loans, £14,123; repayment of capital, £20,270; reserve and renewals fund, £7,013; removal of centre poles, £1,000; part cost of Parliamentary Bill, £550; in aid of general district rate, £24,000. The sum of £9,792 was expended on the maintenance of cars, £8,891 on permanent way, and £936 on overhead electrical equipment. Renewals amounting to £4,629 were charged against the reserve and renewals fund, which now stands at £68,372. Other statistical information was as follows :—

	1912-13.	1913-14.
Percentage, expenses to receipts	64.19	61.82
Expenses per car mile (including interest and repayment of capital)	9.80d.	9.67d.
Units of electrical energy used	5,761,095	5,359,804
Average units per car mile	1.65	1.51
Number of car miles run	3,485,789	3,543,669
Number of passengers	38,484,032	40,535,874
Average passengers per car mile	11.04	11.43
Average journeys per head of population	148	155
Average fare paid per passenger	1.02d.	1.02d.
Average daily number of cars in service	104	105
Average length of penny stage	1.68miles.	1.70 miles.

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WEEKLY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended May 16 give total receipts of £231,369, or £31,525 less than in the corresponding week last year. The total length of track was 2,863 miles, or 24 more than for the corresponding week. Receipts were at the rate of £80 16s. 3d. per track mile, a decrease of £11 15s. 9d. as compared with the corresponding week of last year, which included the Whitsun holiday.

THE BRITISH ELECTRICAL FEDERATION.

The traffic statement for the week ended May 15, 1914, shows that the receipts from tramways and railways amounted to £38,838 as compared with £50,469 in the corresponding week last year, and from omnibuses £14,377, as compared with £7,967, making a total of £53,215, as compared with £58,466. The tramway and railway route mileage was 429.82 as compared with 428.47. Upon such of the services as were working both last year (Whitsun week) and this year the receipts show a decrease of £12,177 upon the week.

RAILWAYS OF THE UNITED KINGDOM.

The summary of the official traffic returns of the fifty principal railways of the United Kingdom for the week ended May 17 gives a total of £2,234,304, which was earned on 22,161 miles, being at the rate of £100 16s. 5d. per mile of line open. For the corresponding week of 1913 the receipts of the same lines amounted to £2,240,175, with 22,100 miles open, or £101 15s. 5d. per mile. There was thus a decrease of £14,871 in the receipts, an increase of 61 in mileage, and a decrease of 19s. in receipts per mile. Thirty-six of the returns distinguish between the receipts from passenger and goods traffic, and these show a decrease of £274,349 (or £12 15s. per mile) in the passenger receipts and an increase of £249,733 (or £11 6s. 9d. per mile) in the receipts from goods traffic. The aggregate receipts of the fifty railways since the beginning of the year amounted to £43,267,485, in comparison with £43,883,039 last year, a decrease of £615,554.

COPPER AND ALUMINIUM MARKET.

May 22, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

	Friday, May 22.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	62 17 6	63 5 0	69 0 0
,, ,, (three months)	63 10 0	63 17 6	68 12 6
Electrolytic Copper—bars or ingots	65 17 6	65 17 6	73 0 0
Aluminium—bars or ingots	83 0 0	83 0 0	91 0 0

COAL MARKET.

May 22, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

	Friday, May 22.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	s. d.
Best Admiralty Welsh (large)	24 0	24 0	27 0	
Best Seconds	23 3	23 3	26 3	
Ordinary Drys	21 0	21 0	24 6	
Best Washed Nuts	20 6	20 6	22 0	
Best Washed Peas	19 6	19 6	20 6	
Cardiff, f.o.b.—				
Best Admiralty (large)	19 6	19 6	22 6	18 0
Best Seconds	18 9	18 9	21 9	17 3
Ordinary Drys	16 6	16 6	20 0	15 3
Best Washed Nuts	16 0	16 0	17 6	..
Best Washed Peas	15 0	15 0	16 0	..
Newcastle, f.o.b.—				
Best Steams	15 3	14 0	16 0	13 9
Best Seconds	12 6	12 6	14 6	12 0
Smalls	8 6	8 6	11 9	9 9

No Quotations owing to transport workers strike.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregate. Wks.	Aggregate. 1913-4.	Aggregate. Increase or Dec.
Anglo-Argentine	May 18	£58,781	£52,697	19	£1,071,847	+ £11,477
Auckland (28 days)	April	20,216	21,702	41	204,124	+ 4,813
Ballarat and Bendigo	March	3,904	4,151	50	47,694	— 701
Brazilian St. Rly. Mlrs	March	46,496	54,582	34	423,040	+ 65,979
Brazilian Traction	May 16	92,292	95,400	20	1,890,063	+ 80,549
Brisbane	April	25,390	28,610	17	110,525	+ 11,095
British Columbia $	March	720,493	717,281	39	6,752,082	+ 849,161
Buenos Aires Pt. & City	October	6,615	7,442	43	68,109	+ 5,294
Buenos Aires Lacroze	April	44,215	43,411	43	445,536	+ 6,311
Calcutta Rs.	May 16	60,060	62,722	19	13,48,144	+ 64,116
Cape Town	March	13,197	13,992	13	41,980	+ 2,693
Carthagena & Herreria	April	3,050	2,069	17	10,189	— 2,933
Cordoba	March	12,668	13,499	52	159,207	+ 13,593
East India	April	1,760	1,837	39	17,239	+ 717
Kalgoorlie	April	3,073	2,820	17	9,805	— 1,508
La Plata	April	5,807	4,716	17	19,956	— 1,639
Lima	Feb.	32,206	33,880	9	71,758	+ 5,423
Lisbon Mlrs.	Jan.	...	156,175	4	156,175	...
Madras (14 days) Rs.	May 15	27,206	29,191	19	262,218	+ 22,292
Melbourne	Feb.	62,500	64,000	9	132,500	+ 3,000
Mexico $	April	583,558	594,998	17	2,845,807	+ 264,849
Montevideo	April	30,087	29,645	26	200,176	+ 414
Para	May 3	4,030	3,581	22	76,863	— 14,561
Port Elizabeth	March	3,943	4,535	13	12,875	+ 844
Puebla $	March	62,500	67,300	13	195,400	+ 23,800
Rangoon Tramways	April	5,351	5,367	17	22,014	+ 675
Shanghai $	May 13	22,824	25,200	19	460,800	+ 76,695
Singapore $	May 16	12,458	12,844	19	240,364	+ 9,723
Toronto $	March	772,491	836,328	13	2,461,956	+ 194,224
Winnipeg $	March	329,016	347,812	13	1,081,461	+ 80,516

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1913-4.	Increase or Dec.
Aberdeen Corporation..	May 18	£1,576	£1,926	+ £50	50	£78,833	+ £4,846
Accrington Corp.	" 13	681	555	— 126	6	3,695	+ 160
Ayr Corporation	" 16	285	271	+ 16	52	18,364	+ 2,646
Bath Electric	" 13	767	815	+ 48	19	15,233	+ 1,176
Birkenhead Corp.	" 17	1,307	1,259	— 48	6½	8,739	+ 296
Birmingham Corp.	" 16	12,895	12,230	— 665	7	88,738	+ 4,981
Blackburn Corporation	" 13	1,642	1,179	— 463	7	9,726	+ 946
Blackpool Corporation	" 14	3,385	687	— 2,678	7	8,583	+ 1,448
Bolton Corporation	" 17	3,011	2,909	— 102	7	19,846	+ 1,436
Bournemouth Corp.	" 20	2,115	2 012	— 103	7	15,003	+ 803
Bradford Corporation..	" 16	7.600	6,325	— 1,275	7	48,071	+ 2,717
Brighton Corporation .	" 17	1,211	1.039	— 172	6½	7,186	+ 676
Bristol	" 15	10.174	8,043	— 2,131	19½	151,466	+ 11,766
British Elec. Federatn.	" 15	58,466	53,215	*	...	...	...
Burnley Corporation ..	" 16	1,931	1,654	— 307	7	12,317	+ 555
Burton-on Trent Corp.	" 17	302	290	— 12	7	2,021	+ 82
Bury Corporation	" 17	1.626	1,395	— 231	6½	9,700	+ 404
Cardiff Corporation	" 9	2,576	2,731	+ 155	5	16,121	+ 1,454
Chatham and District.	" 14	1,134	836	— 298	19	16,533	+ 159
Chesterfield Corp.	" 14	350	251	— 99	6	1,886	+ 252
Colne Corporation	" 16	373	290	— 83	...	...	...
Cork Electric	" 14	517	500	— 17	19	8 934	+ 149
Croydon Corporation ..	" 8	1,581	1,695	+ 114	5	10,086	+ 1,455
Darlington Corporation	" 16	287	259	— 28	7	1,803	+ 99
Derby Corporation	" 16	1,254	998	— 256	6½	6,907	+ 322
Dover Corporation	" 16	294	206	— 88	7	1 577	+ 72
Dublin & Lucan	" 15	161	136	— 25	19	2,403	— 55
Dublin United	" 15	6,175	5,704	— 472	20	105,265	— 3 117
Dundee City	" 13	1,256	1,272	+ 16	52	67,698	+ 4,330
East Ham Corporation	" 16	1.150	986	— 164	6½	6 926	— 226
Exeter Corporation	" 15	428	323	— 105	7	2,324	— 182
Gearless Motor 'Buses.	" 16	...	481	...	20	9.098	...
Glasgow Corporation	" 16	20,672	22,357	+ 1,685	50	1,031.940	+ 70,499
Glossop(U.Elec.Supply)	" 16	155	128	— 27	20	2 454	— 52
Halifax Corporation	" 12	2,117	1 885	— 1,232	6	13,306	+ 462
Hastings & District.	" 13	1,247	827	— 420	19	15,493	— 165
Huddersfield Corp.	" 16	2,820	2,193	— 627	7	15,706	+ 1,146
Hull Corporation	" 16	3,337	3,054	— 283	7	21,141	— 241
Ilford U.D.C.	" 16	587	458	— 129	6	3,941	+ 318
Ilkeston Corporation	" 20	124	136	+ 12	7	950	+ 16
Ipswich Corporation	" 16	599	447	— 152	7	2,977	+ 187
Isle of Thanet	" 16	852	465	— 387	33	12,351	+ 654
Kilmarnock Corp.	" 15	128	157	+ 29	52	9.059	+ 541
Lanarkshire	" 14	1.741	1,849	+ 108	19	35,818	+ 4,853
Lancashire United	" 13	1,765	1,567	— 198	19	30.465	+ 3,669
Leeds City	" 16	10,226	8,239	— 1,987	7	56,829	+ 2,524
Leicester Corporation	" 16	3,327	2.882	— 445	20	55,887	+ 2,920
Leith Corporation	" 16	700	723	+ 23	52	36,870	+ 1,871
Leyton U.D.C.	April 30	1,284	1,353	+ 69	4	5 740	+ 776
Liverpool Corporation.	May 16	13.702	13,115	— 587	19½	251,174	+ 12,314
Llandudno & Colwyn B.	" 15	645	229	— 416	24	4 504	— 320
London County Council	" 13	44,671	42,779	— 2,092	6	271,310	+ 11,419
London Gnl. Omnibus..	" 16	73,927	64,916	— 9,011	20	1,171,674	+ 26,272
London United	" 15	9,239	5,935	— 3,304	20	118,923	+ 2,530
Lowestoft Corporation	" 16	252	163	— 90	33	5,877	+ 653
Maidstone Corporation	" 14	265	183	— 82	7	1.448	+ 126
Manchester Corp.	" 16	20.670	17,614	— 3,056	7	119,611	+ 3.762
Met. Elec. Trys.	" 15	11.380	8,858	— 2,522	20	172,253	+ 3,710
Nat. Steam Car Co., Ld.	" 14	3,371	4,520	+ 1,149	31	110.218	+ 47,984
Nelson Corporation	" 16	248	202	— 46	6½	1,445	+ 41
N'castle-on-Tyne Corp.	" 16	4,689	5,034	+ 345	7	34,637	+ 3,288
Newport (Mon.) Corp.	" 16	869	787	— 82	7	5,539	+ 496
New St. Helens & Dist.	" 13	1,176	781	— 395	46	37.180	+ 2,881
Northampton Corp	" 15	384	136	— 248	6½	3 802	+ 89
Nottingham Corp.	" 14	4,059	3,276	— 783	6½	21.934	+ 380
Oldham Corporation	" 17	2,294	2,380	+ 86	8	18.142	+ 1,497
Portsmouth Corp.	" 16	2,522	2.049	— 473	7	15 444	...
Preston Corporation	" 13	1,155	818	— 337	7	6,182	— 10
Provincial	" 16	2,535	1,870	— 665	32	57,524	+ 3,179
Reading Corporation	" 14	905	665	— 140	6	4,493	+ 816
Rhondda	" 14	1,479	1,193	— 286	19	23,336	+ 896
Rochdale Corporation	" 16	1,989	1,584	— 405	7	11,241	+ 494
Rotherham Corp.	" 20	941	1,031	+ 90	7	6,917	+ 40
Salford Corporation	" 18	6,739	5,313	— 1,426	7	35 599	+ 238
Sheffield Corporation	" 17	8,180	7,641	— 539	7½	57.990	+ 2,040
Southampton Corp.	" 13	1,464	1,290	— 174	6	8,149	+ 449
Southend-on-Sea Corp.	" 13	1,189	791	— 398	7	5.875	+ 1,139
South Met. Trys.	" 15	1,207	1,091	— 116	20	20,534	+ 5,621
South Shields Corp.	" 16	792	741	— 51	6½	5,060	+ 696
Sunderland Corp.	" 17	1.482	1.410	— 72	7	9,622	+ 385
Sunderland District	" 13	704	539	— 165	28	16 067	+ 1,277
Swindon Corporation	" 13	187	155	— 32	6	1 083	+ 130
Torquay	" 14	879	503	— 376	19	9.149	+ 120
Trys. (M.E.T.) 'Buses	" 16	4.689	9,299	+ 4,610	20	168.780	...
TynesideTrys.&Tmrds	" 13	599	507	— 92	19	9.865	+ 529
Wallasey Corporation	" 16	1.876	1,209	— 367	6½	8,428	+ 484
Walsall Corporation	" 16	848	606	+ 242	20	12,203	+ 74
Walthamstow U.D.C.	" 16	1,072	750	— 322	7	5,489	+ 670
Warrington Corp	" 7	455	438	— 17	5	2,351	+ 10
West Ham Corporation	" 14	3,203	2,711	— 492	6	18,312	+ 798
Wigan Corporation	" 14	1,807	1.470	— 337	6	9,662	+ 210
Wolverhampton Corp	" 20	1.085	1,059	— 26	8	7,805	— 5
Yorkshire (W. Riding)	" 17	2.047	1.613	— 434	20	28,638	+ 699

* From such of the services as were working both last year and this year the receipts show a decrease of £12,177 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London.	May 16	£4,388	£4,932	+ £544	20	£101,112	— £3,911
City and South London	" 16	2,692	2.508	— 184	20	54.998	— 4,243
Liverpool Overhead.	" 17	1,983	1,892	— 90	20	33.385	+ 923
London Electric.	" 16	13,650	13,520	— 130	20	287.935	+ 250
Mersey	" 16	2,308	2.212	— 96	20	45.178	+ 18
Metropolitan	" 16	17.448	18,151	+ 703	20	357.888	+ 29,947
Metropolitan District	" 16	13.041	12,901	— 140	20	262.876	+ 153

The Tramway & Railway World can be obtained, post free, at the following rates —

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AMBERLEY HOUSE, NORFOLK ST., W.C.

TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, May 22.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	69½ — 71½
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	...	4⅜ — 4⅝
5	Do. 5½% Cum. 2nd Pref.	+ ⅛	4¼ — 4⅝
100	Do. 4% Deb. Stk. Red.	...	92 — 94
100	Do. 4½% Deb. Stk. Red.	...	98½ — 101½
100	Do. 5% Deb. Stk. Red.	...	96½ — 98½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 — 106
1	Bath Electric Tramways, Lim. Pref. Ord	...	1/16 — 3/16
1	Do. 5% Cum. Pref	...	1/8 — 3/16
100	Do. 4½% 1st. Mort. Deb. Stock, Red.	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	— ½	84½ — 86½
10	Blackpool and Fleetwood Tramroad Co.	...	14 — 15
	Bombay Elec. Supply and Trams. Co., Ord.	...	14 — 15
10	Do. do. 6% Cum. Pref.	...	10¼ — 11¼
100	Do. do. 4½% Db. Stk. Red.	...	94½ — 96½
$100	Brazilian Traction Light and Power Co. Lim.	— 1	77 — 79
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	— ½	7 — 7⅛
5	Do. do. 5% Cum. Pref	...	4⅞ — 5⅛
100	Do. do. 4½% 1st Deb Stock, Red.	...	98 — 101
10	Bristol Tramways and Carriage Co.	...	6¾ — 7
10	Do. do. 4% Cum. Pref.	...	6⅞ — 7⅛
100	Do. do. 4% Deb. Stock	...	100 — 102
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck	...	111 — 115
100	Do. Pref. Ord. Stock	...	104 — 108
100	Do. 5% Cum. Perpetual Pref. Stock.	— 1	103 — 106
100	Do. 4½% 1st Mort. Debs.	+ 1	97 — 100
40	Do. 4½% Vancouver Power Debs.	...	94 — 98
100	Do. 4½% Perpetual Cons. Deb Stk.	...	93½ — 95½
100	British Elec. Traction Co., Lim., 6% Cum. Pref.	+ ½	88½ — 91½
100	Do. 7% Non-Cum. Pref.	— 1	54 — 57
10	Do. 6% Pref. Ord. Non-Cum.	...	14½ — 16½
100	Do. Deferred Ord. Stock	...	5½ — 7½
100	Do. 5% Perpetual Debenture Stock.	+ ½	92½ — 94½
100	Do. 4½% Second Debenture Stock, Red.	...	77 — 80
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	73 — 78
1 00	Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb	...	99½ — 101½
5	Calcutta Tramways Co., Limited, Ord.	...	6¼ — 7
5	Do do. 5% Cum. Pref.	...	5 — 5¼
100	Do. do. 4½% 1st Deb. Stock, Red	...	97 — 100
1	Cape Electric Tramways, Ld.,	...	⅛ — ¼
10	Carthagena and Herrerias Steam Tramways Co., Lim	...	2¾ — 3¼
100	Do. 5% Debs. Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co (1904), Lim.	...	5⅛ — 5⅜
100	Do. 4% Debenture Stock Red, 1935	...	93 — 97
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.	...	88 — 92
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	...	89 — 92
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref	...	— 6⅞
10	Dublin United Trams. Co. (1896) Lim. Ord.	+ 1/16	— 11
10	Do. do. 6% Pref.	+ 1/16	— 12⅜
100	Do. do. "A" Red.	...	— 80¼
100	Do. do. Deb. Stock "B" Red.	..	— 80
10	Gateshead & Dist Trys. Co., Ord.	...	8½ — 9
10/-	Hastings & Dist. Electric Trams. Co., Ld., Ord.	...	3/16 — 5/16
1	Do. do. 6% Cum Pref.	...	13/16 — 15/16
100	Do. do. 4½% Deb. Stk. Red.	...	65 — 70
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	93½ — 97½
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)	...	86 — 90
10	Imperial Tramways, Ord.	...	3 — 3½
10	Do. do. 6% Cum. Pref.	...	6½ — 6¾
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.	...	2 — 2¼
100	Do. 4% Debenture Stock	...	73 — 78
1	Kalgoorlie Elec. Trams., Ltd.	...	...
100	Do. do. 5% "A" Deb. Stk.	...	84 — 89
100	Do. do. 6% "B" do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.	...	3/16 — 5/16
10	Lanarkshire Tramways Co.	— ⅛	9⅛ — 10⅜
100	Lancashire United Tramways. 5% Prior Lien Deb.	...	87 — 89
1	Lisbon Electric Trams., Lim., Ord.	...	1/16 — 1/8
1	Do. 6% Cum. Pref.	...	1/8 — 1/4
100	Do. 5% Mort. Debs.	...	95 — 100
1	London and Suburban Trac. Co., Lim., Ord.	...	1/16 — 3/16
100	London General Omnibus Company, Limited. 4½% Deb.	...	99 — 101
100	Do. Do. 5% Cum, Inc. Deb. Stk. Red.	...	89 — 93
100	London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red	...	56 — 60
100	Madras Electric Trams. (1904) Lim., 6% Cum. Pref.	...	4⅞ — 5¼
5	Do. do. 5% Deb. Stk., Red.	...	101 — 103
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	78 — 81
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	...	105 — 108
$1,000	Do. do. 5% Bds.	...	99¾ — 100¼
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	1/8 — 1/16
100	Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red.	...	87 — 90
100	Do. 5% Deb. Stock, Red.	...	85½ — 88½
100	Mexico Tramways Co., Common Stock	+ 3⅛	66 — 70
500	Do. Gen. Con. 1st Mort. Gld. Bonds	...	77 — 81
100	Do. 6% 50-yr. Mort. Bonds	+ 1	74 — 79
...	Michigan United Railways 5% 1st Mort. Gld. Bonds	...	90 — 92
100	Montreal Street Railway, Sterling 4½% Debs. (1922)	...	98 — 100
100	Do. 4½% Sterling Debs, (1922)	...	97 — 99
1	National Steamr Car Co. Ltd.	+ 3/32	3/4 — 13/16
10	Oldham—Ashton and Hyde Elec. Ord.	...	6 — 6½
10	Do. do. 5% Cum. Pref.	...	5⅞ — 6¼
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	3⅞ — 4⅛
5	Do. do. 6% Cum. Pref.	...	4 — 4½
1	Perth (W.A.) Elec. Trams.. Ld., Ord.	...	—
1	Potteries Electric Traction Co., Ltd., Ord.	...	1/16 — 1/8
1	Do. 5% Cum Pref.	...	1/16 — 1/8
100	Do. 4½% Debenture Stock, Red.	...	81¾ — 84¾
1	Provincial Tramways, Lim.. Ord.	...	1/16 — 1/8
10	Do. 5% 1st Deb. Stock	...	99 — 103
...	Puebla Tramway, Light & Power Co., Prior Lien 5%	...	73 — 78
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.	...	5 — 5¼
100	Do. do. 4½% 1st Mt. Db. Stk	...	96 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	87 — 89
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	+ ⅛	95½ — 97½
100	Do. do. 5% 50-yr. Mort. Gold Bonds	+ ½	87¾ — 89¾
100	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	...	96 — 100
$500	Do. 5% 1st Mort. Debs., Red., 1929	...	96 — 99
10	Shanghai Elec. Construction Co.	...	13¾ — 18¾
100	Singapore Elec. Tramways Lim., 5% Debs. Red	...	88 — 93
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref.	...	...
100	Do. do. 4% Deb. Stk.	...	66 — 70
...	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	95 — 97
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	97 — 99
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	— 1	81 — 83
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	90 — 93
5	United Elec. Tramways of Monte Video, Ord.	...	4½ — 5⅛
5	Do. do. 6% Cum. Pref.	...	4⅞ — 5⅛
100	Do. do. 5% 1st Deb. Stk. Red.	...	92½ — 95½
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	93¼ — 96¼
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	1/16 — 1/8
5	Do. do. 6% Cum Pref.	...	4¾ — 5⅛
100	Do. do. 4½% 1st Deb. Stock. Red.	...	84 — 87

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

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WEEKLY LIST OF TENDERS INVITED.

BOROUGH OF DARWEN.

TRAMWAYS DEPARTMENT.

The Corporation invite tenders for the supply and delivery of Two Double-Deck Electric Tramcars. Specifications, form of tender, and further particulars may be obtained from F. J. S. Hosken, General Manager, Lorne Street, Darwen, on deposit of £1 1s., which will be returned on receipt of a *bonâ-fide* tender.

Tenders, endorsed "Tenders for Tramcars," to be delivered to the undersigned not later than the 15th day of June, 1914.

The Corporation do not bind themselves to accept the lowest or any tender.

By order, WILLIAM P. HALLIWELL,
Town Clerk.

Town Clerk's Office, Darwen,
May 21, 1914.

GREAT NORTHERN RAILWAY COMPANY (IRELAND).

The Directors are prepared to receive tenders for

Permanent Way Fastenings.

Specifications and forms of tender may be obtained from the Secretary.

Tenders, made out on the forms supplied by the Company, should be delivered, under sealed cover, endorsed "Tender for Permanent Way Fastenings," to the undersigned not later than 10 a.m. on Monday, June 29, 1914.

The Directors do not bind themselves to accept the lowest or any tender.

T. MORRISON,
Secretary.

Secretary's Office,
Amiens Street Terminus, Dublin,
May 27, 1914.

BOROUGH OF HAMPSTEAD.

TENDERS FOR TURBINE, CONDENSING PLANT, ETC.

The Council of this Borough invite tenders for the supply, delivery, and erection of:—

(1) One 1,500 kw. Turbo Alternator.
(2) Barometric Jet Condenser and Pipework.
(3) Cooling Tower and Tanks.

Copies of the specification, formal conditions, etc., may be obtained upon application to the Chief Engineer and Manager, Electricity Works, Lithos Road, Finchley Road, N.W., on payment of two guineas, which will be returned on receipt of a *bonâ-fide* tender.

Tenders sealed and endorsed on the outside "Tenders for Extension of Electricity Works Plant," to be addressed to the Town Clerk, Town Hall, Haverstock Hill, N.W., and delivered not later than 10 a.m. on Thursday, June 11 next.

(By order) ARTHUR P. JOHNSON,
Town Clerk.

Town Hall, Haverstock Hill,
May 19, 1914.

HARROGATE CORPORATION.

ELECTRICITY DEPARTMENT.

The Electricity Committee are prepared to receive tenders for the supply and erection of an Economiser, consisting of 288 pipes, in three banks 8 pipes wide.

The economiser, to be constructed under the supervision of a recognised Insurance Company, must be complete with all accessories, suitable for a continuous working pressure of 160lbs. per square inch.

Sealed tenders, together with full specification (endorsed "Tender for Economiser"), stating earliest date for completion, to be addressed to the undersigned not later than June 22, 1914.

GEO. WILKINSON.

33, Swan Road, Harrogate.

COUNTY OF LONDON.

The London County Council invites tenders for the manufacture, supply, delivery, and maintenance of, alternatively, at the discretion of the Council, fifty, one hundred, or one hundred and fifty, complete Trailer Cars, and the equipment of two hundred existing electric Motor Cars with Couplers and Traction Gear for drawing trailer cars.

The specification, form of tender, etc., may be obtained on application to the Clerk of the Council at the County Hall, Spring Gardens, S.W., after payment to the Cashier of the Council of the sum of £2. This amount will be returnable only if the tenderer shall have sent in a *bonâ-fide* tender, and shall not have withdrawn the same. Particulars may be obtained at the County Hall before the payment of the fee. The drawings and samples referred to in the specification may be viewed at No. 303, Camberwell New Road, S.E., by appointment with the Chief Officer, London County Council Tramways, 62, Finsbury Pavement, E.C., on production of either a copy of the specification or a signed receipt for the fee in respect thereof.

The person whose tender is accepted will be bound by the contract to pay wages at rates not less, and to observe hours of labour not greater, than the rates and hours set out in the Council's list. Particulars of the Council's Standing Orders as to its conditions of tender and contract are given in every issue of the *London County Council Gazette*. No tender received after 11 a.m. on Tuesday, June 23, 1914, will be considered. The Council does not bind itself to accept any tender.

LAURENCE GOMME,
Clerk of the London County Council.

County Hall, Spring Gardens, S.W.,
May 22, 1914.

SOUTH INDIAN RAILWAY COMPANY, LTD.

The South Indian Railway Company, Limited, are prepared to receive tenders for the supply of:—

Steel Rails (35lb. B.S. Flat-bottom), about 2,370 Tons, and Fishplates for above Rails, about 86 Tons.

Specifications and forms of tender may be obtained at the Company's Offices.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Company, Limited, marked "Tender for Steel Rails and Fishplates," must be left with the undersigned not later than 1 o'clock on Wednesday, June 10, 1914.

The Company are not bound to accept the lowest or any tender.

A charge, which will not be returned, will be made of 40s. for each copy of the specifications.

Copies of the drawings may be obtained on payment at the offices of Robert White, Esq., M.Inst.C.E., Consulting Engineer to the Company, 3, Victoria Street, Westminster, S.W.

By order, V. E. de BROE, M.Inst.C.E.,
for Managing Director.

Company's Offices,
91, York Street, Westminster, S.W.,
May 26, 1914.

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WEYBRIDGE URBAN DISTRICT COUNCIL.

TENDERS FOR MOTOR FIRE ENGINE.

The Weybridge Urban District Council invite tenders for the supply of a Motor Fire Engine.

Copies of the specification can be obtained on application to the undersigned.

Tenders to be sent in, marked "Tender for Motor Fire Engine," to me not later than June 8, 1914.

ROBERT ELLWOOD,
Clerk.

Council Offices, Weybridge,
May 26, 1914.

POSITION VACANT.

OLDHAM CORPORATION TRAMWAYS.

LINESMAN.

Wanted, a thoroughly experienced Linesman for Overhead Electrical Equipment. Applications, stating age, wages required, and particulars of experience, together with copies of three recent testimonials, to be addressed to the undersigned and delivered not later than Wednesday, June 3, 1914.

J. W. DUGDALE,
General Manager.

Tramway Offices,
Wallshaw Street, Oldham.
May 26, 1914.

POSITION WANTED.

ENGINEER.

With practical and commercial experience, desires appointment. Several years' experience in Electric Traction work in all details from construction to running. Thoroughly accustomed to management and control of men. Ten years general manager. Highest testimonials. Box 77, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.

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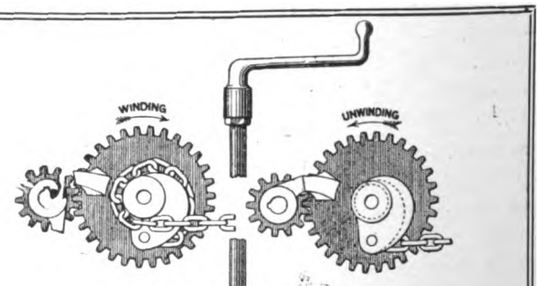

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THE
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SATURDAY, MAY 30, 1914.

THE "OCEAN"

ACCIDENT AND GUARANTEE CORPORATION, LTD.,

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PREMIER INSURER OF TRAMWAYS

HEAD OFFICE:

MOORGATE STREET, LONDON, E.C.

TIME LIMIT IN LABOUR AGREEMENTS.

In the interest of employers and employees it would seem to be desirable that when concessions are made affecting the remuneration and the hours of workmen the representatives of the men should sign an agreement not to submit fresh demands for a term of years. This course is followed by many tramway undertakings, the period generally being for three years. Bradford, where the union men have just formulated their programme, is a case in point, and in the award made last week by the conciliation board of the London County Council tramways as regards the permanent way and building sections the term is two years. In the financial circumstance of the tramways of the metropolis two years may be considered too short a period, a point that may be worth noting by the managements of municipal and company undertakings who are now faced by requests for levelling up their employees' conditions to those prevailing on the County Council's system. The basis of the demand is found in the contention that as through running is now the practice the rates of remuneration should be the same under all the authorities concerned. Instances of the need for fixing a definite term covered by an agreement may be cited both from the provinces and from London. At Newcastle-on-Tyne the union men have been threatening to strike in order to induce the Tramways Committee to consider their programme at a time when they had their attention engaged by the Corporation Bill in Parliament. It appears, too, that after granting improved terms to one class of men last October, the Committee asked the union secretary if there were any more requests to be put forward, as they desired to consider them at once. His reply was that he had only the case of fifth-year men to bring before the Committee, but at the Committee's November meeting nine other concessions were asked for. In the absence of a statement by the London General Omnibus Company, setting forth the concessions upon which a poll of their employees was taken yesterday (Friday), the shareholders have no knowledge as to whether a time-limit has been fixed. The terms which the company have offered are of a liberal nature, for it is estimated that roughly they work out at one-fifth of a penny per mile on the grand total of the company's services. It is stated that the concessions are not likely to affect the dividend. There has been an interesting labour development at Manchester. The union tramwaymen have been complaining of the system of reporting faults and dealing with offenders, and they were engaged from midnight last Saturday to 4 a.m. in considering the replies of the manager to their demands. To the instruction that all men reported for offences must be warned thereof, Mr. McElroy has agreed to add that the warning must be given at the earliest opportunity afterwards if it is impossible to warn the men at the time. In order to prevent men losing time in attending the offices, instructions to attend are to be put in writing. While wisely refusing to abolish plain-clothes inspectors on the ground that it would be practically impossible to detect otherwise certain classes of offences, the manager has agreed to make the rule as to warning men applicable to plain-clothes inspectors. Refusals have been given to the request that all sergeants or inspectors shall give their decisions on reports before the same are sent to the head office, and that any man called upon to answer a serious charge shall be permitted to have an official of the union with him. At the meeting of the men there was a majority in favour of a resolution to reject the manager's replies, but the Tramway Committee on Tuesday approved of the action of their chief officer.

PRIVATE BILL LEGISLATION.

BIRKENHEAD CORPORATION.—Lord Barnard's Committee of the House of Lords on May 19 concluded their hearing of the Birkenhead Corporation Bill, under which powers were asked to run six services of motor omnibuses from tramway termini to the Bromborough, Lower Bebington, and Wirral districts. The Committee decided that the Bill should proceed on the insertion of a clause on the lines suggested by Mr. Vesey Knox on behalf of Cheshire County Council, such clause to apply to the local authorities also, and to provide that any contributions by the Corporation which might form part of any terms and conditions should have reference to the cost of road maintenance only, and not to the cost of widening or improvements. The clause makes the consent of the County Council necessary before the omnibuses can be run in the outside districts, such consent not to be unreasonably withheld, and failing agreement an arbitrator is to decide the question of the amount of contribution to be paid by the Corporation towards the cost of the maintenance of the roads used by the omnibuses.

SHEFFIELD CORPORATION.—The consideration of this Bill by a House of Commons Committee was on May 21 adjourned until June 9. Powers are sought to construct tramways and to run additional motor omnibuses on routes in Derbyshire and the West Riding. Mr. A. R. Fearnley, general manager of the Corporation tramways and motor omnibus services, said they had now five routes of omnibuses running, and all were successful. The total receipts had been £9,127, as against a total of working expenses of £5,917, whilst there had been a net profit over all expenditure of £1,271. They were now asking for powers to run over seven routes, all outside the city, in the shape of extensions of the tramway routes. The expenditure necessary for the extension of the services was estimated at £19,000. Motor omnibuses, witness said, were subject to special taxation; he had noticed in a statement made recently that in London the amount of taxes on each omnibus amounted to £45 per annum. A portion of the money so raised was used for the upkeep of the main roads. In reply to Mr. Wedderburn, K.C., on behalf of the West Riding County Council, Mr. Fearnley said he understood the County Council proposed to allow private owners to run omnibuses free, and proposed to tax the Corporation.

New Tramway System for Vilna.—Approval has been given by the Council of Ministers to the raising of a loan of £427,000 for the installation of electric tramways in Vilna, Russia.

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LIGHT RAILWAYS ACTS, 1896 and 1912.

The Board of Trade have issued the report by the Light Railway Commissioners of their proceedings up to December 31, 1913, and the report of the proceedings of the Board of Trade, under the above-mentioned Acts, up to the same date. On December 31, 1912, three Orders were before the Board of Trade awaiting confirmation; one of these was confirmed in the following year, one was withdrawn, and the remaining one is still under consideration. During 1913 eleven fresh Orders were submitted to the Board of Trade by the Light Railway Commissioners for confirmation. The Board considered each Order with special reference to the points mentioned in section 9 of the Act of 1896, and made such amendments in the Orders as were deemed necessary. Six of the Orders submitted during 1913 were confirmed in the year, making, with the one above referred to, a total number of seven Orders; two have since been confirmed; and the remaining Orders are still under consideration. In no case did the Board refuse to confirm an Order. The Orders confirmed in 1913 authorise about six miles of line, at an estimated cost of £81,487. Since the date of the last report, the Treasury have conditionally promised a special advance under section 5 of the Act of 1896, as amended by section 5 of the Act of 1912, not exceeding £45,000, towards the construction of the proposed Mid-Flintshire Light Railway, and also a special advance, not exceeding £12,625, towards the construction of the proposed Fraserburgh and Rosehearty Light Railway, in place of the grant of £17,413 previously promised in aid of the line as originally proposed to be constructed from Fraserburgh to New Aberdour. In October, 1913, the Board issued amended rules with respect to applications to the Light Railway Commissioners under the Light Railways Acts, 1896 and 1912.

The seventeenth annual report of the Light Railway Commissioners states that a total of 655 applications for Orders to authorise light railways (which includes 113 applications for amending Orders) have been made since the commencement of this Act. In respect of 429 applications (11 in the year 1913 and 418 in previous years) Orders have been submitted to the Board of Trade for confirmation; 11 other applications, in respect of which Orders are under settlement, have been approved by the Commissioners; and 209 have been rejected or withdrawn. The decisions with respect to two applications have been deferred, and four new applications made in November last remain to be considered.

TRAMWAY EMPLOYEES' CONDITIONS.

The Glasgow Tramways Committee have agreed to recommend that in the cases of a large number of the employees the working week be reduced to 51 hours without loss of pay, and that the wages of motormen and conductors be increased after the expiry of their first year of service from 26s. to 28s. weekly, with a corresponding increase each year until the maximum of 35s. is reached. When the last increase was granted in June, 1913, it was arranged that the maximum for the year to May 31, 1914, should be 34s., and that from June 1 next the maximum for all men with seven years' service and upwards should be 35s. Motormen and conductors already enjoy a 51-hour working week. The recommendations are estimated to cost £18,000 per annum.

As the result of concessions which the Derby Tramways Committee have decided to recommend, in response to a petition from the employees, there will be an extra charge upon the undertaking of about £1,400 annually, and from 16 to 20 additional men will be employed. The hours are to be reduced from 60 to 54 per week, and wages increased so as to equal the present weekly payments. All time over 60 hours is to be paid for at the rate of time and a quarter; no man is to work more than five hours without relief, and there is to be one day's holiday in seven.

Tramway conductors at Blackburn have been granted an increase of pay from 6d. to 6¼d. per hour.

The manager of Leyton tramways has been asked to report on proposals put forward by a deputation from the Society of Tramway and Vehicle Workers. The deputation estimated the cost of their demands at £7,000 per year, but Councillor Heather, chairman of the Tramways Committee, has placed the figures at £11,000. Chief among the demands are:—Motormen and conductors 6s. a day for the first six months, 6s. 6d. a day after six months' service, overtime at the rate of time and a half, eight hours' work on ordinary week days, the maximum hours for any day's work not to exceed 8½, half an hour a day for signing on and off, eight hours on Sundays and Good Fridays, including signing on and off allowance of 30 minutes, Christmas Day double pay, washers and cleaners to receive 35s. per week of 48 hours, 14 days' holiday with pay between May and October.

The Belfast City Council have adopted a report by the general manager of the tramways, which recommended an increase of ¼d. per hour to motormen and conductors of all grades, representing £2,000 a year. Councillor J. Johnston objected to the increases, and contended that the motormen and conductors were paid at a higher rate than other cities and towns in the United Kingdom. Alderman Doran, in reply, maintained that Belfast had the best service and the best managed service in the kingdom. They should treat their employees, upon whom they had to rely in such a great degree not only for the success of the undertaking but for the safety of the public, in a fair and generous way.

ACCIDENTS DUE TO TRAMCARS AND OTHER VEHICLES.

In view of the statements that have been made in the press to the effect that a greater portion of accidents occur in streets where tramways are laid than in other thoroughfares, the Highways Committee of London County Council have furnished the Council with information which shows that there is no foundation for that view. They reminded the Council that this aspect of the matter received the special consideration of the Select Committee on Motor Traffic, and drew attention to a paragraph in the report of the Select Committee. This stated that fatal accidents were quite as numerous where there were no tram lines as in streets of a similar class where there were lines. In 117 miles of streets which were both tramway and motor 'bus routes the fatalities caused by power-driven vehicles were in 1910, 67; in 1911, 107; and in 1912, 126; whilst of these the trams were responsible for 19, 18, and 21; and motor omnibuses for 26, 46, and 67. In 119 miles of omnibus routes without trams the fatalities from power-driven vehicles were in the same three years 53, 71, and 109; and of these there were attributed to motor omnibuses 23, 39, and 70. The two divisions of the Metropolitan Police district which had the largest average number of fatalities per square mile for 1910-11 are St. James's, with 11.40 and Marylebone, with 8.98. Neither of these had tramlines. The area which has the largest number of fatalities recorded in 1912 was Bow, where there were 28, of which four were put down to trams and 24 to other power vehicles. The Select Committee did not think that anything had been shown to connect with tramways, even indirectly, the alarming rise of fatalities of recent years.

In an article that appeared in a daily newspaper in the early part of this year, it was stated that Commercial Road, Walworth Road, Old Kent Road, Stratford High Street, Holloway Road, and High Street, Camden Town, were amongst the most dangerous streets in London, and that 46 fatal accidents occurred in these thoroughfares during the year 1913. It appeared that only eight of these accidents were caused by tramcars, the remainder being caused by other vehicles. The total number represented 5.66 accidents per street mile, .98 being attributable to tramcars and 4.68 to other vehicles. It was stated that 15 fatal accidents occurred in the following non-tramway thoroughfares:—Hammersmith Road, Dawes Road, Fulham, Brookmill Road, Deptford. This was equivalent to 7.74 accidents per street mile.

The conclusions which might be drawn from the above figures were supported by the evidence given before the Select Committee by the police representatives of various large cities in England and Scotland. Mr. Rafter, Chief Constable of Birmingham, said:—"There are of course more accidents on the tramway routes in Birmingham than on other routes. That is not altogether due, I should think, to the fact that there are tramways there, but owing to the fact that the tramway people have selected the most important routes in the city to run tramways on. I should fancy that even if the tramways were not on these routes they would still have a preponderance of accidents." Mr. F. Caldwell, Head Constable of Liverpool, said:—"I personally look on the tramways as being a less dangerous form of traffic than any other large form like a motor 'bus service." Mr. R. Peacock, Chief Constable of Manchester, "To say that the trams cause the risk is not the fact. I think, of course, that a motor 'bus is a greater danger than a tramway, in this way: the tramcar is practically running straight, whereas a motor 'bus is moving in and out." Mr. Mackinnon, traffic manager of the Glasgow tramways, "I think that a tram running on a fixed rail is the safest vehicle you can have in your streets."

L.C.C. TRAMWAY MATTERS.

At the weekly meeting on Tuesday of the London County Council, the Highways Committee submitted reports on the following:—

THROUGH RUNNING VIA BARKING BRIDGE ROAD.

An agreement has recently been arrived at between the East Ham Corporation and the Barking Town Urban District Council, under which the District Council's tramways between the East Ham boundary and Barking Broadway will be leased to and worked by the Corporation, and it has been agreed that the through services shall be confined to the tramways worked by the County Council and the East Ham and West Ham Corporations. It has also been proposed that commencing on June 1, 1914, the following modifications shall be made in the existing arrangements:—(1) The service now run by the County Council between Bloomsbury and Canning Town fire station (in respect of which the Council pays to the West Ham Corporation 6d. for each mile run by the Council's cars between Barking Bridge Road and the fire station) is to be extended as far as Green Street during the busy periods of the day; no payment is to be made by the Council to the West Ham Corporation in respect of these services. (2) A service is run by the West Ham Corporation between Stratford and Barking Bridge Road. It is suggested that this service shall be extended into London as far as Burdett Road.

HOURS OF LABOUR AT GREENWICH STATION.

Referring to the request made by the men employed on shift duty at Greenwich generating station that their hours should be reduced from 56 to 48 a week, without reduction of pay, the Electrical Conciliation Board, to which the Council referred the matter on December 16, 1913, were unable to arrive at an agreement, and the question was referred to a court of arbitration

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appointed by the Board of Trade, consisting of Mr. Ernest Moon, K.C. (chairman), Sir A. K. Butterworth, Mr. S. L. Devitt, Mr. W. Brace, M.P., and Mr. A. H. Gill, M.P. The arbitrators on March 24 made the following award :—"The court awards and determines that the request of the employees for the reduction of their hours of labour to 48 hours in seven days without reduction of pay is inadmissible, and award accordingly. The court further awards that the hours of labour shall be reduced to 52 hours in seven days without reduction of pay. The court further awards that the first week in which the principle of a 52 hour working week shall be applied shall be the first working week in June, 1914, unless otherwise agreed between the parties." Steps have been taken for the necessary re-arrangement of the hours to give effect to the terms of the award. It is estimated that the cost of giving effect to the award will be to increase the amount of wages for the first twelve months to approximately £1,030, and eventually the cost will be about £1,160 a year.

EMPLOYEES IN THE PERMANENT WAY AND BUILDING SECTIONS.

The Permanent Way and Building Conciliation Board have agreed to certain additions to the pay of employees in the permanent way and building sections of the tramways department. The cost of giving effect to this increase will amount to £3,754 for the remainder of the year 1914-15, £4,441 for the ensuing year, and £4,470 a year eventually.

RE-ARRANGEMENT OF SUB-STATIONS AND PLANT.

Some of the tramways sub-stations are being called upon at certain times to supply the maximum amount of energy which they can produce, and steps must shortly be taken to provide for any increase in the car services which may have to be made, and also to provide for a greater margin for emergency. The Highways Committee recommended that tenders for the supply of rotary converters, static transformers, and an overhead crane required should be invited by public advertisement.

CAR SHED PLANT

The Highways Committee recommended that (i.) a pneumatic hoist, (ii.) portable compressed air cleaning apparatus, (iii.) two magnetic brake testing instruments, and (iv.) one insulation resistance testing instrument be obtained from Messrs. S. H. Heywood and Co., the Globe Pneumatic Engineering Company, Messrs. Elliott Bros., and Messrs. Evershed and Vignoles, at estimated costs of (i.) £180, (ii.) £150, (iii.) £30, and (iv.) £14 respectively.

BOILER HOUSE WORKSHOP EQUIPMENT.

The following tenders for the supply of materials in connection with the equipment of the boiler house workshop at the Greenwich generating station have been accepted :—

High-speed shaping machine, emery grinder, and universal disc grinder ...	Selson Engineering Co. ...	£104 10s., £29 10s., and £55 10s. respectively.
High-speed sensitive drill and grindstone and trough ...	Buck and Hickman ...	£12 16s. 6d. and £8 respectively.
Portable air compressor and tools ...	Alley and MacLellan ...	£233 10s.
Rope testing gear	W. and T. Avery	£21 5s.

The various proposals made in the foregoing reports were adopted.

There was little tramway business of importance before the Council at its meeting on the previous Tuesday, May 19. The Highways Committee reported that the Metropolitan Electric Tramways, Limited, had given three months' notice, expiring on July 31, 1914, to terminate the existing agreement with the London County Council and the Middlesex County Council providing for the through running of the cars of the Council and the company from Euston Road to Alderman's Hill and Enfield. The Highways Committee are negotiating with the Middlesex County Council and the company for through running after the expiration of the present agreement.

These applications have been referred to the rolling stock conciliation board.

Class of employees.	Present rate of pay.	Increase asked for.
Sawmill machinists	10d. an hour ...	½d. an hour.
Sawyers	9d. an hour ...	½d. an hour.
Plough changers	6½d. an hour ...	Not stated.
Coppersmiths	10d. an hour ...	1d. an hour.
Tinsmiths	10d. an hour ...	1d. an hour.
Crane drivers	35s. a week ...	1½d. an hour.

These applications have been referred to the Rolling Stock Conciliation Board.

BOY CONDUCTORS.

In reply to a question, Mr. G. H. Hume, chairman of the Tramways Committee, said that the boy conductors on the Tooley Street route would work eight to nine hours a day on the average, the work being arranged in split shifts. The boys would be taken on at 16 years of age, and if the experiment was a success they would be employed until 21 years of age, when the question of increased pay would be considered. Preference would be given to sons of men in the tramway service, and during their service the boys would not be required to attend evening school. They would be employed on the cars in addition to the present conductors, but they would not be employed to collect tickets; the police licence would not allow that. The boys being on the platform, the conductors could devote more time to the collection of fares. The whole matter was, however, merely an experiment.

Doncaster Extension on a Grass Track.—An immediate start is to be made in the construction of an extension of the Corporation tramways to the new colliery districts of Woodlands and Warmsworth. The rails to Woodlands will be laid on the grass margin at the side of the road.

TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION.

PROGRAMME OF THE ANNUAL CONGRESS.

As already announced, the Annual Congress of the Tramways and Light Railways Association will be held at Newcastle-on-Tyne, on July 16 and 17. The programme is as follows :—

THURSDAY, JULY 16.

10 a.m.—Reception by the Lord Mayor and Members of the Tramways Committee at the Connaught Rooms, where the meetings will be held.
11 a.m. to 1 p.m.—Papers and Discussions.
3 p.m.—Excursion and Garden Party given by the Corporation at Jesmond Dene.
7.30 p.m.—Banquet at Tilley's Rooms, given by the Corporation.

FRIDAY, JULY 17.

10.30 a.m. to 1 p.m.—Papers and Discussions at Connaught Rooms.
2.45 p.m.—River trip provided by the Newcastle Tramways Committee.
4.30 p.m.—Arrival at Tynemouth Pier.
6.30 p.m.—Return by the North Eastern Railway's electric trains, special cars being provided by the Tynemouth Tramways.
9 p.m.—Supper and Dance at Tilley's Rooms, given by the Northern General Transport Company.

The headquarters will be the Central Station Hotel. Special saloons and restaurant cars will be reserved on the train leaving King's Cross Station on Wednesday, July 15, at 2.15 p.m., arriving at Newcastle at 7.57 p.m.

Further particulars may be obtained from the Secretary, Caxton House, Westminster.

MISCELLANEOUS NEWS AND NOTES.

Education in Safety Methods at Glasgow.—It is reported that with the opening of the new financial year of the tramways department on June 1 a scheme is likely to be inaugurated for educating the public in safety methods.

Mudguard for Omnibuses.—Representatives of London municipal councils recently witnessed a demonstration of the Graveley mudguard, given by the company formed for the purpose of forwarding that invention. On a specially-prepared section of road in Halton Road, Islington, canvas screens were set up to show the effect of the splashguard. They remained practically clean after the omnibus with the guards had passed, but a shower of mud bespattered them when the guards were removed.

First-Class Cars Abandoned at Birmingham.—Owing to the want of sufficient patronage the first-class cars on the Hagley Road route have been withdrawn. To cope with the development of the Sparkhill, Hall Green, and Tyseley districts the tramways have been extended from College Road to Hall Green, and the cars will start running on May 31. In accordance with the omnibus company's agreement with the Corporation under which competition with the tramways is not permitted, it is expected that the company will be given notice to terminate their motor service to Hall Green.

Through Running in Aberdeen.—It is recommended by the Tramways Committee that the agreement with the Suburban Tramways Company in regard to the running of the through cars of the company over the lines of the Corporation be renewed for a period of one year, and thereafter from year to year, subject to six months' notice on either side. A question having arisen as to the remuneration of the company's employees, the company had informed the committee that the average rate of wages was now between 5d. and 6d. per hour, and that the conditions of employment, as regarded days off, had also been substantially improved.

Newcastle Employees' Demands.—The Newcastle branch of the Association of Tramway and Vehicle Workers recently decided that if the Tramways Committee did not meet their representatives by May 27 in the matter of the "all grades programme," they would take a ballot of the men on the question of withholding their labour. Alderman Rogers, chairman of the Tramways Committee, has stated that the men's original letter was referred to the Traffic Sub-Committee on March 26, and matters had since been delayed owing to the business of the Parliamentary Bill. An interview with the men, he added, would be fixed this week or next.

Amalgamation of Plymouth, Stonehouse, and Devonport.—The Local Government Board propose to issue an Order uniting the Three Towns. In the report of the Amalgamation Sub-Committee of Plymouth Council, it is claimed that they "proved the public have been deprived of the facilities which the three tramway systems could give owing to the divided counsels and conflicting policies of the Three Towns. The evidence shows that in 1919, so far as the Devonport and District Tramways are concerned, those tramways can be linked up with the Plymouth tramways and worked as one system. In 1922 the Plymouth, Stonehouse, and Devonport Company's lines in Plymouth and Devonport respectively will come into the possession of, and will be under the control of, the local authorities. This will leave the lines in Stonehouse still in the company's possession, but from the nature of the circumstances an arrangement with the company will then be easy to effect. With one local authority acting in the interest of the Three Towns it may be possible to arrange for through working before those dates. Through running is estimated to yield an additional profit of at least £7,000 a year."

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Delegates to the International Tramways Congress.—Mr. James Dalrymple, tramways general manager, Mr. J. Lindsay, Town Clerk, and two members of the Tramways Committee will represent Glasgow Corporation at the 18th biennial Congress of the International Tramways and Light Railways Union, to be held in August at Buda-Pesth.

The Working of Nottingham Merit Grade Scheme.—It is mentioned in the annual report of Mr. J. Aldworth, the general manager of Nottingham Corporation Tramways, that the payment of bonuses to drivers and conductors for economy in the consumption of power was withdrawn on December 31, and a merit grade was adopted in its place. This resulted in an immediate increase of wages of £1,265 per annum. The scheme has worked quite smoothly and appears to have given general satisfaction.

Institution of Civil Engineers.—The council have made the following awards for papers read and discussed during the session 1913-1914:—Telford Gold Medal to Mr. F. W. Cowie (Montreal); George Stephenson Gold Medal to Mr. F. E. Wentworth-Sheilds (Southampton); Watt Gold Medals to Mr. Thos. Clarkson (Chelmsford) and Mr. H. Fowler (Derby); and Telford Premiums to Professor E. G. Coker (London), Mr. W. A. Scoble (London), Mr. Wm. Willox (London), and Mr. S. P. W. D'Alte Sellon (London).

New Ticket Box Offered to Newcastle.—Councillor Rodgers, chairman of the Tramways Committee, has announced that hitherto not much success has attended the experiment of boxes for the collection of used tickets. Consideration is, however, being given to a new kind of box, which would be more prominent than those used in the past, and, when the committee have definitely decided, each car would be so fitted up. The committee are also to consider the question of using warnings regarding the use of dangerous hatpins.

Kearney Demonstration Railway.—Mr. E. W. C. Kearney has been granted by the London County Council the use till the end of October of a part of the island site between Aldwych and the Strand for the construction of an endless track for the running of a car on the Kearney high-speed system. The scheme provides for enclosing the track with scenery and laying out the ground as a rustic garden. A model of the Kearney system was exhibited at the Crystal Palace a few years ago, and it is claimed that the system provides a much higher speed than is at present attained by any underground line. The principal feature is that the tracks come near to the surface at stations, descending to whatever depth may be necessary in view of buildings between the stations.

Concessions to London Omnibus Men.—Conferences were held daily last week between the representatives of the London General Omnibus Company and their employees' union to consider the demands put forward by the latter. Mr. A. H. Stanley, managing director of the combined traffic companies, presided, and the London General Omnibus Company were also represented by Messrs W. J. Iden (chief engineer), H. E. Blain (operating manager), Ramsforth (assistant engineer), Lansdown (operating superintendent), S. Lane (engineers' department), and several garage superintendents. The union secretary announced on May 23 that the company had granted concessions that constituted a victory for the men "all along the line." The demand for a daily wage for drivers and conductors had not been acceded to, but an increase of the mileage rates had been secured. When the spread-over was 13 hours the men would get an extra shilling. The minimum rate of pay for drivers would be 6s. 8d. a day and 5s. 8d. for conductors. These classes had demanded 10s. and 8s. 6d. a day respectively.

Bristol Corporation Favour Purchase of the Tramways.—By 46 votes to 30 Bristol City Council on May 26 adopted the recommendation of the Tramways Option Committee in favour of purchasing the tramways of the Bristol Tramway and Carriage Company. In the absence of Alderman Pearson, owing to illness, the resolution was proposed by Councillor Gane, and the proceedings were attended by Messrs. J. F. C. Snell and J. B. Hamilton, the experts upon whose report the Committee based their recommendation. The two consultants sat by Councillor Gane, together with Mr. Faraday Proctor, the city electrical engineer. Although members were at liberty to put questions to them without their remarks counting as a speech, no interrogations were made. Councillor Gane paid a tribute to the splendid service of the Tramways Company, which now had 3,000 workpeople and 2,000 shareholders in and around Bristol. He confessed to considerable misgiving at first at the thought that the city was going to take the heart out of that undertaking, but the answer was that the company were parties to the option which now confronted the Council. The company refused to see a deputation, and had fought the Council tooth and nail. A poll of the ratepayers has now to be taken.

Petrol-Electric Omnibuses at Warrington.—The accounts of the motor omnibus department of the Warrington Corporation, of which Mr. J. Telfer is manager, cover the period from July 3, 1913, to March 31, 1914. The total working costs have been 7.636d. per omnibus mile, and the average receipts amounted to 9.261d., leaving a balance of 1.625d. Included in the working costs are the following items:—Traffic expenses, 2.754d.; general expenses, .737d.; general repairs and maintenance, 1.466d.; and cost of petrol, 2.679d.; making a total of 7.636d. per 'bus mile. The Corporation organised the motor omnibus department under the Warrington Corporation Act, 1911, when borrowing powers to the amount of £5,000 for a period of five years were granted. So far £2,837 have been expended, leaving borrowing powers to the amount of £2,163 unexercised. The two routes upon which the double-deck omnibuses were run were 2.375 and 1.250 miles in length, and the 'bus miles run numbered 59,154. There were 618,139 passengers. The number of 'buses (double-deck, petrol-electric) was three, and the average number in use two. The average fare paid per passenger was .886d., and the number of passengers per 'bus mile was ten. Fares were a penny for adults and a halfpenny for children. The seating capacity per 'bus was 34, and the average working hours per day per 'bus was 15.716. Traffic revenue totalled £2,283, the total revenue being £2,296. Working expenses were £1,882, and interest on capital £71. The net balance of £337 was set aside for the appropriation account.

CONTRACTS AND ORDERS.

Messrs. Grenshaw and Peers, of Bolton, have received a contract from Southend Council for three electrically-driven coal wagons, at £303.

A.E.G. Electrical Company, of Johannesburg, have received a contract for the erection and equipment of a power station from Heidelberg Council.

Ilford Council have placed contracts with Mawdsley's, Limited, for a battery booster, and with Messrs. Pritchetts and Gold for storage batteries at a sub-station.

West Ham Tramways Committee have recommended the acceptance of the tender of John Baker and Co. to supply 32in. and 22in. tramway tyres, at £1 6s. 8d. and 19s. 3d. each respectively.

Dundee Council have accepted the tender of Hurst, Nelson and Co. for car bodies with vestibule ends at £420 each; of the United Electric Car Company for trucks, including electro-mechanical track brakes; and of Dick, Kerr and Co. for electrical equipments.

Walthamstow Council have been recommended to place contracts as follow:—Babcock and Wilcox, Limited, supplying an additional boiler, overhead bunkers and conveying plant, at £2,589, and for the supply and fixing of pipe work, at £385; the New Conveyor Company, Limited, installing conveyors and ash bunkers, at £3,825.

Huddersfield Council have placed contracts as appended:—Switchgear for controlling the motor-converters at the tramway power station, Bruce Peebles and Co., Limited; switchboard for tramway supply, Ferguson, Pailin and Co.; steam pipes, John Spencer, Limited; cable, Geipel and Co., and B.I. and Helsby Cables, Limited.

Glasgow Tramways Committee have accepted tenders as subjoined:—Rails and fishplates for Govan depôt, Barrow Hæmatite Steel Company, Limited; clevis bolts, J. Hally Craig; rubber-insulated cable, W. T. Henley's Telegraph Company, Limited; three-core lead-covered cable, single core lead-covered cable, J. Hally Craig; double-lead sheathed telephone and test cables, e.h.t. rubber-insulated cables, B.I. and Helsby Cables, Limited.

PERSONAL.

Tribute to the Hastings Tramway Management.—Mr. G. Kitchin, chairman of the Hastings and District Tramways Company, in his remarks at the annual meeting, mentioned with regret that the general manager (Mr. T. B. Holliday) had been seriously ill during the season, and the board gave him a long holiday in order that he might recover his health. During his absence Mr. Edwards, who had charge of the power station, had carried on the work, and was appointed deputy-manager for that purpose. The company was, at the Hastings end of it at any rate, well managed, and the shareholders would like these gentlemen to know that they felt they did their work well.

FINANCIAL REPORTS AND MEETINGS.

Merthyr Electric Traction and Lighting Company.—The report for 1913 gives a surplus of £4,888, after setting aside £3,000 for renewals, and £929 was brought forward. A dividend on the ordinary shares of 7 per cent. is proposed, placing £1,000 to reserve and carrying £660 forward.

Burton Corporation Tramways.—This undertaking last year produced an income of £16,567, an increase of £820, the average traffic revenue per car mile having risen from 7.09d. to 8.28d. Passengers increased from 3,188,655 to 3,339,784. The operating costs rose from 6.41d. to 6.58d. per car mile. Gross revenue shows a surplus of income over expenditure of £3,847, compared with £3,352. The repayment of debt and interest charges amounted to £2,683, leaving a net surplus of £1,163. A sum of £1,500 provided out of the rates has been placed to the renewals fund, and of the above surplus £562 has been utilised to wipe out the suspense account, the balance, amounting to £602, being carried forward.

Reading Corporation Tramways.—For the year 1913-14 the total revenue was £36,910, an increase of £2,447. Working expenses were £20,504, a decrease of £202, notwithstanding that the car mileage increased from 915,180 to 941,303 miles. The number of passengers was 8,865,128 (9.42 per car mile), or 101 per head of the population, against 8,251,274 the previous year. The cost of generating energy has been further reduced from .78d. to .737d. per unit. The gross profit of £16,346 is £1,877 more than for the preceding year, and the net profit of £4,419 is £1,618 higher. Mr. G. F. Craven, the general manager and engineer, states that the balance in the reserve fund at March 31 was £15,841, and if the Council decide to put the whole of this year's net profit to the reserve fund the figure would then be £20,261, which is only 8.83 per cent. of the capital value of the undertaking. At a comparatively early date very extensive renewals to permanent way will be necessary.

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Progress at Bournemouth.—Mr. I. Bulfin has presented his annual report to the Tramways Committee, showing traffic receipts £104,969, an increase of £8,959, of which £5,713 was due to Sunday traffic. The receipts per car mile were 12.83d. as against 12.24d. in the previous year. The working expenses, exclusive of capital charges, amount to £59,135, being at the rate of 7.23d. per car mile, the working expenses being 56.33 per cent. of the receipts. This figure is slightly more than the previous year, due to the reduction in working hours of the staff, time and quarter for Sunday work, and increased cost of coal and other materials. The net profit was £13,107, and the committee recommend that £1,000 be placed to reserve and the balance to renewals. Councillor Davis, chairman of the committee, said that five years ago the undertaking showed a loss of £5,000. The change for the better was due to the manager and the staff. Councillor Bell, ex-chairman, said that the burgesses who voted for Sunday running had also to be thanked for a great deal of the profit now earned.

Manchester Tramways Annual Report.—In their report to the Corporation on the working of the tramways during the year ended March 31 last the Tramways Committee state that 6 miles 318 yards of new lines were opened between May 9 and October 13, the aggregate length of single track now being 194 miles 969 yards, including the lines over which the Corporation exercise running powers. The revenue account for the past two years is summarised as follows :—

	1913-14.	1912-13.
	£	£
Traffic revenue	911,233	876,022
Other revenue	10,444	8,055
Parcels revenue	3,641	3,568
	925,309	887,646
Working expenses	585,223	557,737
Balance—gross profit	340,085	329,909
Add bank, etc., interest	13,594	14,281
Available	353,620	344,190

Out of which the following charges have been met :—

	1913-14.	1912-13.
	£	£
Interest on mortgage debt	55,728	55,770
Redemption of debt	54,599	52,393
Contribution to street improvements—Interest and sinking fund	6,597	5,114
Rent, etc., of tramway	26,327	25,109
Leaseholds—Proportion of outlay	809	837
Income tax	9,418	8,613
	153,371	147,839

Leaving a balance, which has been appropriated as follows :—

	1913-14.	1912-13.
	£	£
Reserves, renewals, and depreciation account	97,219	96,351
In aid of the rates	103,090	100,000
	200,300	196,351

In the revenue account the income and expenditure per car mile are shown, together with the corresponding figures for the preceding year. These figures are shown in summarised form below :—

	1913-14.	1912-13.		
	d.	d.		d.
Total Revenue	11.410	11.351	increase	.059
Working Expenses	7.216	7.132	increase	.084
Gross profit	4.194	4.219	decrease	.025

The main items of the working expenses are as follows :—

	1913-14.	1912-13.		
	d.	d.		d.
Traffic Expenses	3.411	3.269	increase	.142
General Expenses	1.103	1.069	increase	.034
Repairs and Maintenance	1.105	1.085	increase	.020
Power Expenses	1.597	1.709	decrease	.112
	7.216	7.132		

The increase in the traffic expenses is accounted for by the increased scale of wages adopted for nearly all grades of labour chargeable to this account, and the accident in High Street caused the increase in general expenes under the head of compensation. The consumption of electrical energy decreased from 30,514,278 units to 30,035,057, and the units per car mile from 1.625 to 1.543. During the year the scheme for the revision of fares and stages, provisionally adopted by the committee in December, 1912, and approved by the Council, has been put into operation. The effect of the change is shown in the large increase in the number of passengers carried; this increase during the year was 17,033,558. The number of passengers carried per car mile has increased by 10 per cent. and the average number of journeys per head of population has risen from 201 to 218.

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Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
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WEEKLY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended May 23 give total receipts of £244,303, or £19,403 more than in the corresponding week last year. The total length of track was 2,803 miles, or 24 more than for the corresponding week. Receipts were at the rate of £85 7s. 3d. per track mile, an increase of £6 2s. 3d. as compared with the corresponding week of last year.

THE BRITISH ELECTRICAL FEDERATION.

The traffic statement for the week ended May 22, 1914, shows that the receipts from tramways and railways amounted to £43,511 as compared with £30,878 in the corresponding week last year, and from omnibuses £10,246, as compared with £7,041, making a total of £50,757, as compared with £46,919. The tramway and railway route mileage was 429.82 as compared with 428.47. Upon such of the services as were working both last year and this year the receipts show an increase of £5,030 upon the week.

RAILWAYS OF THE UNITED KINGDOM.

The summary of the official traffic returns of the fifty principal railways of the United Kingdom for the week ended May 24 gives a total of £2,264,011, which was carried on 22,161 miles, being at the rate of £102 3s. 9d. per mile of line open. For the corresponding week of 1913 the receipts of the same lines amounted to £2,285,150, with 22,100 miles open, or £103 8s. per mile. There was thus a decrease of £20,539 in receipts, an increase of 61 in mileage, and a decrease of £1 4s. 3d. in receipts per mile. Thirty-six of the returns distinguish between the receipts from passenger and goods traffic, and these show a decrease of £2,511 (or 4s. 8d. per mile) in the passenger receipts and a decrease of £18,474 (or £1 0s. 3d. per mile) in the receipts from goods traffic. The aggregate receipts of the fifty railways since the beginning of the year amounted to £45,532,096, in comparison with £46,168,189 last year, a decrease of £636,093.

COPPER AND ALUMINIUM MARKET.

May 29, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

	Friday, May 29.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	63 0 0	62 17 6	68 0 0
,, ,, (three months)	63 12 6	63 10 0	67 17 6
Electrolytic Copper—bars or ingots	66 0 0	65 17 6	72 10 0
Aluminium—bars or ingots	83 0 0	83 0 0	91 0 0

COAL MARKET.

May 29, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

	Friday, May 29.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	s. d.
Best Admiralty Welsh (large)	25 0	24 0	27 0	
Best Seconds	24 0	23 3	26 0	
Ordinary Drys	21 6	21 0	24 0	
Best Washed Nuts	20 6	20 9	22 0	
Best Washed Peas	19 6	19 6	20 6	
Cardiff, f.o.b.—				
Best Admiralty (large)	20 6	19 6	22 6	18 0
Best Seconds	19 6	18 9	21 6	17 6
Ordinary Drys	17 0	16 6	19 6	15 3
Best Washed Nuts	16 0	16 0	17 6	
Best Washed Peas	15 0	15 0	16 0	
Newcastle, f.o.b.—				
Best Steams	14 6	15 3	15 6	13 6
Best Seconds	12 6	12 6	14 0	11 0
Smalls	8 6	8 6	11 6	9 9

No Quotations owing to Transport Workers' strike.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregate. Wks.	Aggregate. 1913-4.	Increase or Dec.
Anglo-Argentine	May 20	£57,156	£55,358	20	£1,126,715	+ £7,689
Auckland (28 days)	May 8	21,662	22,168	45	226,392	+ 5,419
Ballarat and Bendigo	Mar. 29	2,756	2,915	52	49,969	— 1,242
Brazilian St. Rly. Mlrs	March	46,496	54,582	34	423,040	+ 65,379
Brazilian Traction	May 23	91,929	93,666	21	1,983,729	+ 82,256
Brisbane	April	25,390	28,610	17	110,525	+ 11,095
British Columbia $	April	706,633	698,708	43	7,450,590	+ 341,036
Buenos Aires Pt. & City	April	6,659	6,428	17	29,804	+ 3,418
Buenos Aires Lacroze	April	44,215	43,411	43	445,536	+ 6,311
Calcutta Rs.	May 23	62 174	63,910	20	14,12,054	+ 65,852
Cape Town	April	12,175	13,408	17	55,388	+ 3,926
Carthagena & Herreria	April	3,050	2,069	17	10,189	— 2,933
Cordoba	March	12,668	13,499	52	159,207	+ 13,593
East India	April	1,760	1,837	39	17,229	+ 717
Kalgoorlie	April	3,073	2,820	17	9,805	— 1,508
La Plata	April	5,307	4,716	17	19,956	— 1,639
Lima	April	33,930	34,200	17	140,583	+ 5,910
Lisbon Mlrs.	March	...	160,592	...	...	...
Madras (14 days) Rs.	May 15	27,206	29,191	19	262,258	+ 22,293
Melbourne	April	65,500	65,000	17	262,500	+ 500
Mexico $	April	583,558	594,988	17	2,345,807	+ 264,842
Montevideo	April	30,087	29,645	26	200,176	+ 414
Para	May 3	4,030	3,581	22	76,363	— 14,561
Port Elizabeth	April	4,357	3,758	17	16,633	+ 245
Puebla $	April	60,700	63,100	17	263,500	+ 31,200
Rangoon Tramways	April	5,351	5,267	17	22,014	+ 675
Shanghai $	May 20	22,313	23,400	20	484,200	+ 77,782
Singapore $	May 23	11,971	11,346	20	251,710	+ 9,098
Toronto $	April	760,676	880,299	17	3,292,255	+ 263,847
Winnipeg $	April	323,583	337,414	17	1,418,875	+ 94,306

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks	1913-4.	Increase or Dec.
Aberdeen Corporation..	May 20	£1,586	£1,752	+ £166	51	£81,585	+ £5,013
Accrington Corp.....	" 20	580	604	+ 24	7	4,299	+ 184
Ayr Corporation	" 23	300	387	+ 87	1	464	+ 66
Bath Electric	" 20	1,217	1,369	+ 152	20	16,603	+ 1,329
Birkenhead Corp.	" 24	1,226	1,264	+ 38	7½	10,004	+ 835
Birmingham Corp.	" 23	11,189	12,712	+ 1,573	8	96,459	+ 6,554
Blackburn Corporation	" 20	1,203	1,430	+ 227	8	11,156	+ 1,157
Blackpool Corporation	" 21	2,132	860	— 1,272	8	9,443	— 121
Bolton Corporation	" 24	2,756	2,751	— 5	8	22,597	+ 1,481
Bournemouth Corp.....	" 27	2,052	1,825	— 227	8	16,828	+ 576
Bradford Corporation..	" 24	5,664	6,099	+ 435	8	49,170	+ 3,152
Brighton Corporation..	" 24	1,025	1,077	+ 52	7½	8,203	+ 728
Bristol	" 22	7,489	9,177	+ 1,688	20½	160,643	+ 13,454
British Elec. Federatn.	" 22	46,919	59,757	*	...	...	...
Burnley Corporation ..	" 23	1,572	1,647	+ 75	8	13,834	+ 630
Burton-on-Trent Corp.	" 24	270	302	+ 32	8	2,322	+ 113
Bury Corporation.....	" 24	1,408	1,321	— 87	7½	11,021	+ 317
Cardiff Corporation.....	" 16	3,131	2,744	— 387	6	18,866	+ 1,067
Chatham and District..	" 21	839	955	+ 116	20	17,489	+ 275
Chesterfield Corp.	" 14	350	251	— 99	6	1,886	+ 252
Colne Corporation	" 23	273	310	+ 37	...	...	...
Cork Electric.....	" 21	493	591	+ 98	20	9 545	+ 247
Croydon Corporation ...	" 15	2,127	1,604	— 523	6	11,690	+ 932
Darlington Corporation	" 23	241	256	+ 15	8	2,064	+ 114
Derby Corporation	" 23	984	1,022	+ 38	7½	7,929	+ 361
Dover Corporation	" 23	221	242	+ 21	8	1 819	+ 92
Dublin & Lucan	" 22	158	170	+ 12	20	2,573	— 43
Dublin United	" 25	5,896	6,409	+ 513	21	111,674	— 2,634
Dundee City	" 20	1,297	1,336	+ 39	5 dys	976	+ 31
East Ham Corporation	" 23	949	1,061	+ 112	7½	7,986	— 115
Exeter Corporation	" 22	331	384	+ 53	8	2,708	— 235
Gearless Motor 'Buses.	" 23	...	547	...	21	9.645	...
Glasgow Corporation ...	" 23	20,611	22,368	+ 1,757	51	1,054,207	+ 72,122
Glossop (U.Elec.Supply)	" 23	125	124	— 1	21	2 578	— 53
Halifax Corporation ...	" 19	2,007	2,208	+ 201	7	15,514	+ 663
Hastings & District.....	" 20	1,005	996	— 9	20	16,495	— 174
Huddersfield Corp.	" 23	2,036	2,268	+ 232	8	17,975	+ 1,379
Hull Corporation	" 23	2,956	3,044	+ 88	8	24,185	+ 329
Ilford U.D.C.	" 23	453	497	+ 44	7	3,851	+ 362
Ilkeston Corporation ..	" 27	139	123	— 16	8	1,073	Nil
Ipswich Corporation ..	" 23	418	571	+ 153	8	3,549	+ 347
Isle of Thanet	" 23	556	537	— 19	34	12,887	+ 634
Kilmarnock Corp.	" 23	173	176	+ 3	1	244	— 32
Lanarkshire	" 21	1,728	2,129	+ 401	20	37,946	+ 5,253
Lancashire United	" 20	1,677	1,851	+ 174	20	32 321	+ 3,819
Leeds City	" 23	8,005	8,513	+ 508	8	65,312	+ 3,244
Leicester Corporation...	" 23	2,768	3,018	+ 250	21	58,906	+ 3,257
Leith Corporation	" 23	736	799	+ 63	1	932	+ 70
Leyton U.D.C.	" 7	1,294	1,339	+ 45	5	7 079	+ 821
Liverpool Corporation..	" 23	12,579	13,773	+ 1,194	20½	264,948	+ 13,508
Llandudno & Colwyn B.	22	378	236	— 137	25	4 740	— 457
London County Council	" 20	40,644	44,961	+ 4,117	7	316,271	+ 15,536
London Gnl. Omnibus..	" 23	69,216	74,154	+ 4,938	21	1,245,828	+ 81,210
London United	" 22	6,785	7,570	+ 785	21	120,794	+ 3,316
Lowestoft Corporation	" 23	186	186	Nil	34	6.063	+ 653
Maidstone Corporation	" 21	182	205	+ 23	8	1.653	+ 149
Manchester Corp.....	" 23	17.005	18,343	+ 1,338	8	137,954	+ 5,164
Met. Elec. Trys.	" 22	9,176	10,232	+ 1,056	21	182,485	+ 3,765
Nat. Steam Car Co.,Ld.	" 21	3,162	5,429	+ 2,267	32	115.642	+ 50,251
Nelson Corporation.....	" 23	216	220	+ 4	7½	1,565	+ 45
N'castle-on-Tyne Corp.	" 23	4,508	5,114	+ 606	8	39,751	+ 4,084
Newport (Mon.) Corp....	" 23	695	825	+ 130	8	6,384	+ 615
New St. Helens & Dist...	" 20	769	961	+ 192	47	38,141	+ 3.073
Northampton Corp	" 22	533	616	+ 83	7½	4 418	+ 122
Nottingham Corp.	" 21	3,139	3,463	— 324	7½	25 392	+ 704
Oldham Corporation ...	" 24	2,174	2.231	+ 57	9	20 373	+ 1,554
Portsmouth Corp.....	" 23	2,104	2.365	+ 261	8	17 810	...
Preston Corporation ...	" 20	781	884	+ 103	8	7.066	+ 94
Provincial	" 23	1,739	1,933	+ 194	33	59,507	+ 3,343
Reading Corporation ..	" 21	636	757	+ 121	7	5,249	+ 437
Rhondda.....	" 21	1,116	1,227	+ 111	20	24 564	+ 1,007
Rochdale Corporation	" 23	1,563	1,659	+ 96	8	12,900	+ 691
Rotherham Corp.....	" 27	961	975	+ 14	8	7,892	+ 54
Salford Corporation ...	" 25	5,506	5,034	— 22	8	40.653	— 276
Sheffield Corporation...	" 24	7,292	7,532	+ 240	8½	65,522	+ 2,429
Southampton Corp.....	" 20	1,279	1,379	+ 100	7	9.548	+ 549
Southend-on-Sea Corp.	" 20	797	912	+ 115	8	6,788	+ 1,254
South Met. Trys.	" 22	836	1,263	+ 407	21	21,795	+ 6,026
South Shields Corp.....	" 23	664	754	+ 86	7½	5,815	+ 789
Sunderland Corp.....	" 24	1,373	1,463	+ 90	8	11,085	+ 474
Sunderland District ...	" 20	506	622	+ 116	29	16 691	+ 1,395
Swindon Corporation ...	" 20	160	183	+ 23	7	1 266	+ 150
Torquay.....	" 21	637	588	— 49	20	9 738	+ 71
Trys. (M.E.T.) 'Buses	" 23	4,134	10,193	+ 6,059	21	178,373	...
TynesideTrys.&Tmrds	" 20	477	575	+ 98	20	10,480	+ 627
Wallasey Corporation	" 23	1,169	1,300	+ 131	7½	9,724	+ 615
Walsall Corporation ...	" 23	577	628	+ 51	21	12,831	+ 124
Walthamstow U.D.C....	" 23	753	864	+ 111	8	6,358	+ 1,534
Warrington Corp	" 7	455	438	— 17	5	2,351	+ 10
West Ham Corporation	" 21	2,699	2 943	+ 254	7	21,155	+ 1,052
Wigan Corporation	" 21	1,428	1,584	+ 156	7	11,253	+ 369
Wolverhampton Corp	" 27	1,056	1.016	— 40	9	8,822	— 46
Yorkshire (W. Riding)	" 24	1,429	1.395	— 34	21	30 053	+ 665

* From such of the services as were working both last year and this year the receipts show an increase of £5,030 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London.....	May 23	£4,663	£4,803	+ £140	21	£105,915	— £3.771
City and South London	" 23	2,547	2,477	— 70	21	57,475	+ 4 313
Liverpool Overhead.....	" 24	1,659	2,001	+ 342	21	35,366	+ 1,265
London Electric.....	" 23	13,300	13,270	+ 270	21	301,265	+ 520
Mersey	" 23	2,157	2.174	+ 17	21	47,352	+ 35
Metropolitan	" 24	16.503	18,148	+ 1,645	21	378,036	+ 31,592
Metropolitan District.	" 23	12.892	13,039	+ 147	21	275 915	+ 300

The Tramway & Railway World can be obtained, post free, at the following rates —

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Tel. No.: 2945 Gerrard.
Telegraphic Address: "Tramigro," London.

AMBERLEY HOUSE, NORFOLK ST., W.C.

TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, May 28.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	69½ — 71½
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	— ⅛	4⅛ — 4⅜
5	Do. 5½% Cum. 2nd Pref.	...	4¼ — 4½
100	Do. 4% Deb. Stk. Red.	+ ½	92½ — 94½
100	Do. 4½% Deb. Stk. Red.	...	94½ — 101½
100	Do. 5% Deb. Stk. Red.	+ 2	98½ — 101½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 — 106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅜ — ⅝
1	Do. 5% Cum. Pref	...	½ — ¾
100	Do. 4½% 1st. Mort. Deb. Stock, Red.	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	...	84½ — 86½
10	Blackpool and Fleetwood Tramroad Co.	...	14 — 15
	Bombay Elec. Supply and Trams. Co., Ord.	...	14 — 15
10	Do. do. 6% Cum. Pref.	...	10¾ — 11¼
100	Do. do. 4½% Db. Stk Rd.	...	94½ — 96½
$100	Brazilian Traction Light and Power Co. Lim.	+ ⅜	80 — 82
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	— ⅜	6⅝ — 7⅛ xd
5	Do. do. 5% Cum. Pref	— ⅛	4¾ — 5¼ "
100	Do. do. 4½% 1st Deb Stock, Red.	...	98 —101
10	Bristol Tramways and Carriage Co.	...	6¾ — 7
10	Do. do. 4% Cum. Pref.	...	6⅞ — 7⅛
100	Do. do. 4% Deb. Stock	...	100 —102
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stk.	— 1	110 —114
100	Do. Pref. Ord. Stock	— 1	103 —107
100	Do. 5% Cum. Perpetual Pref. Stock.	...	103 —106
100	Do. 4½% 1st Mort. Debs.	...	97 —100
40	Do. 4½% Vancouver Power Debs.	...	94 — 98
100	Do. 4½% Perpetual Cons. Deb. Stk.	...	93½ — 95½
100	British Elec. Traction Co., Lim., 6% Cum. Pref.	...	88½ — 91½
100	Do. 7% Non-Cum. Pref.	+ 2	56 — 59
10	Do. 6% Pref. Ord. Non-Cum.	— ½	14 — 16
100	Do. Deferred Ord. Stock	+ ⅛	6 — 8
100	Do. 5% Perpetual Debenture Stock	...	92½ — 94½
100	Do. 4½% Second Debenture Stock, Red	...	77 — 80
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	73 — 78
100	Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb.	...	99½ —101½
5	Calcutta Tramways Co., Limited, Ord.	...	6½ — 7
5	Do do. 5% Cum. Pref.	...	5 — 5¼
100	Do. do. 4½% 1st Deb. Stock, Red.	...	97 —100
1	Cape Electric Tramways, Ld.,	...	⅝ — ¾
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	2¾ — 3½
100	Do. 5% Debs. Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co. (1904), Lim.	...	5⅛ — 5⅞
100	Do. 4% Debenture Stock Red, 1985	...	92 — 97
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.	+ 2	90 — 94
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	+ 2	91 — 94
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	— 6⅞
10	Dublin United Trams. Co. (1896) Lim. Ord.	— ⅛	— 10⅞
10	Do. do. 6% Pref.	— ⅛	— 12½
100	Do. do. "A" Red.	...	— 80¼
100	Do. do. Deb. Stock "B" Red.	...	— 80
10	Gateshead & Dist Trys. Co., Ord.	...	8½ — 9
10/-	Hastings & Dist. Electric Trams. Co., Ld., Ord.	...	⅜ — ⅝
1	Do. do. 6% Cum. Pref.	...	⅜ — ⅝
100	Do. do 4½% Deb. Stk. Red.	...	65 — 70
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	93½ — 97½
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)	...	86 — 90
10	Imperial Tramways, Ord.	...	3 — 3½
10	Do. do. 6% Cum. Pref.	...	6½ — 6¾
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 6% Cum. Pref.	...	2 — 2½
100	Do. 4% Debenture Stock	...	73 — 78
1	Kalgoorlie Elec. Trams., Ltd.	...	...
100	Do. do. 5% "A" Deb. Stk.	...	84 — 89
100	Do. do. 6% "B" do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.	...	⅜ — ½
10	Lanarkshire Tramways Co.	...	9⅛ — 10⅜
100	Lancashire United Tramways. 5% Prior Lien Deb.	...	87 — 89
1	Lisbon Electric Trams., Lim., Ord.	...	1⅜ — 1½
1	Do. 6% Cum. Pref.	...	⅝ — 1⅛
100	Do. 5% Mort. Debs.	...	95 —100
1	London and Suburban Trac. Co., Lim., Ord.	...	¾ — ⅞
100	London General Omnibus Company, Limited, 4½% Deb.	...	99 —101
100	Do. Do. 5% Cum. Inc. Deb. Stk. Red.	— 1	88 — 91
100	London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red	...	56 — 60
100	Madras Electric Trams. (1904) Lim., 6% Cum. Pref.	...	4⅞ — 5¼
5	Do, do. 5% Deb. Stk., Red.	...	101 —103
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	78 — 81
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	...	105 —108
$1,000	Do. do. 5% Bds.	...	99½ —100¼
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	⅛ — 1⅛
100	Metropolitan Elec. Trms. Ltd., 4½% Deb Stock, Red.	...	87 — 90
100	Do. 5% Deb. Stock, Red.	...	85½ — 88½
100	Mexico Tramways Co., Common Stock	+ 5	71 — 75
500	Do. Gen. Con. 1st Mort. Gld. Bonds	+ 1	78 — 82
100	Do. 6% 50-yr. Mort. Bonds	+ 1	75 — 80
...	Michigan United Railways 5% 1st Mort. Gld. Bonds	...	90 — 92
100	Montreal Street Railway, Sterling 4½% Debs. (1922)	...	98 —100
100	Do. 4½% Sterling Debs, (1922)	...	97 — 99
1	National Steam Car Co. Ltd	...	⅞ — ⅞
10	Oldham—Ashton and Hyde Elec. Ord.	...	6 — 6½
10	Do. do. 5% Cum. Pref.	...	5⅞ — 6⅛
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	3⅞ — 4⅛
5	Do. do. 6% Cum. Pref.	...	4 — 4½
1	Perth (W.A.) Elec. Trams.. Ld., Ord.	...	—
1	Potteries Electric Traction Co., Ltd., Ord.	— ⅛	⅞ — 1⅛ xd
1	Do. 5% Cum. Pref.	...	⅞ — 1⅛
100	Do. 4½% Debenture Stock, Red.	...	81¾ — 84½
1	Provincial Tramways, Lim., Ord.	...	⅞ — 1⅛
10	Do. 5% 1st Deb. Stock	...	98 —102
...	Puebla Tramway, Light & Power Co., Prior Lien 5%	...	73 — 78
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.	...	5 — 5¼
100	Do. do. 4½% 1st Mt. Db. Stk	...	95 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	87 — 89
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30-yr. 5% Gd. Bds.	+ 2	97½ — 99½
100	Do. do. 5% 50-yr. Mort. Gold Bonds	...	87½ — 89½
100	Sao Paulo Tr. Light & Power Co., 5% Perp. Cons. Debs.	...	96 —100
$500	Do. 5% 1st Mort. Debs., Red., 1929	...	96 — 99
10	Shanghai Elec. Construction Co.	— ⅛	12¾ — 13½ xd
100	Singapore Elec. Tramways Lim., 5% Debs. Red	...	88 — 93
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref.	...	...
100	Do. do. 4% Deb. Stk.	...	66 — 70
...	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	95 — 97
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	97 — 99
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	81 — 83
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	90 — 93
5	United Elec. Tramways of Monte Video, Ord.	...	4⅝ — 5⅛
5	Do. do. 6% Cum. Pref.	...	4⅞ — 5⅛
100	Do. do. 5% 1st Deb. Stk. Red.	...	92½ — 95½
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	93½ — 95½
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	⅞ — 1⅛
5	Do. do. 6% Cum. Pref.	...	4¾ — 4⅞
100	Do. do. 4½% 1st Deb. Stock. Red.	...	84 — 87

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THE

Tramway & Railway World

Vol. XXXV. No. 23.] LONDON, SATURDAY, JUNE 6, 1914. [Established in 1892.

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

CITY OF BRADFORD.

TRAMWAYS DEPARTMENT.

TENDER FOR SOLID RUBBER TYRES.

The Bradford Corporation are prepared to receive tenders for the supply of Solid Rubber Band Tyres, required by the Tramways Department for two years, as follows, viz. :—

Schedule No. 1.—Petrol Vehicles.

Schedule No. 2.—Railless Electric Trolley Vehicles.

Schedules and conditions of tender may be had on application at the Tramways Offices, 7, Hall Ings, Bradford, on payment of the sum of one guinea, which amount will be refunded on receipt of a *bonâ-fide* tender.

(Cheques to be made payable to the order of the Bradford Corporation.)

The contract will be let subject to the Fair Contracts Clauses of the Corporation.

Tenders, endorsed "Tender for Solid Rubber Tyres," to be sent to me not later than Saturday, June 13. The lowest or any tender will not necessarily be accepted.

FREDERICK STEVENS,
Town Clerk.

Town Hall, Bradford,
May 29, 1914.

BOMBAY, BARODA, AND CENTRAL INDIA RAILWAY.

The Directors are prepared to receive up to noon on Tuesday, June 23, tenders for the supply of :—

1. Rails and Fish-Plates.
2. Steel Sleepers and Keys.
3. Cast Iron Pot Sleepers.

Tenders must be made on forms, copies of which, with specifications, can be obtained at these offices on payment of 20s. each (which will not be returned).

The Directors do not bind themselves to accept the lowest or any tender.

C. CROMMELIN,
Secretary.

Offices: Gloucester House,
110, Bishopsgate, London, E.C.,
May 29, 1914.

COUNTY BOROUGH OF WOLVERHAMPTON.

ELECTRICITY DEPARTMENT.

Tenders are invited for the supply, delivery, and erection of

Condensing Water Cooling Towers.

Specification and form of tender may be obtained from the undersigned on payment of one guinea, which will be returned on receipt of a *bonâ-fide* tender.

Tenders, addressed to the Chairman of the Electricity Committee, Town Hall, Wolverhampton, and endorsed "Tender for Cooling Towers," to be delivered on or before June 30, 1914.

S. T. ALLEN, M.I.E.E.,
Chief Engineer and General Manager.

Electricity Works,
Commercial Road, Wolverhampton.

DONCASTER CORPORATION.

TRAMWAYS DEPARTMENT.

The Electricity and Tramways Committee are prepared to receive tenders for the Construction of Light Railways Extensions (Permanent Way and Road Widening) to Brodsworth and Warmsworth respectively.

The Corporation do not bind themselves to accept the lowest or any tender, and contractors tendering do so at their own cost and charges.

A charge of ten shillings, which will not be returned, will be made for each copy of the form of tender, specification, and bill of quantities, which may be obtained on payment at the Office of the Borough Engineer, 3, Priory Place, Doncaster, where copy of drawings may also be inspected on or after Wednesday, June 10, 1914.

Tenders, endorsed "Tender for Permanent Way," are to be addressed to the Chairman of the Electricity and Tramways Committee, and delivered at the Office of the undersigned before noon of Monday, June 22, 1914.

R. A. H. TOVEY,
Town Clerk.

1, Priory Place, Doncaster,
May 30, 1914.

MADRAS AND SOUTHERN MAHRATTA RAILWAY COMPANY (LIMITED).

The Directors are prepared to receive tenders for :—

(1) About 2,250 Tons Cast Iron Sleepers and Fittings,
(2) About 45 Tons Cast Iron Chairs,

in accordance with the specifications, which may be seen at the offices of the Company. The charge for specification No. 1 is one guinea, and for No. 2 half-a-guinea, which will not be returned.

Tenders must be sent in, addressed to the Secretary, not later than 2 p.m., on Tuesday, June 16, 1914, marked "Tender for Sleepers," or as the case may be.

The Directors do not bind themselves to accept the lowest or any tender.

H. BONHAM-CARTER,
Secretary.

Company's Offices:
91, York Street, Westminster, S.W.,
May 22, 1914.

ELECTRIFICATION OF MELBOURNE SUBURBAN RAILWAYS.

The Agent-General for Victoria is prepared to receive tenders for the supply, delivery, and erection in Melbourne of :—

Rotary Converters and Frequency Changers

for use in connection with the electrification of the Melbourne Suburban Railways now being carried out.

Specification and form of tender may be obtained from Messrs. Merz and McLellan, Consulting Engineers, 32, Victoria Street, Westminster, S.W., on or after Monday, the 8th of June, 1914. Any *bonâ-fide* tenderer requiring information in addition to that contained in the specification may apply to Messrs. Merz and McLellan.

The charge for the specification in duplicate is £5 5s., and £2 2s. each for any further copies. Sums paid as above will be refunded on receipt of a *bonâ-fide* tender for the whole of the works included in the specification. The cheques, which must accompany applications for the specification, are to be crossed and made payable to the Agent-General for Victoria.

Sealed tenders, marked "Electrification of Melbourne Suburban Railways—Tenders for Rotary Converters and Frequency Changers," are to be addressed to the Agent-General, and delivered at his office, Melbourne Place, Strand, W.C., not later than 12 noon on July 6, 1914.

The Government do not bind themselves to accept the lowest or any tender, and ample security will be required from the contractor whose tender is accepted.

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COUNTY BOROUGH OF SWANSEA.

ELECTRICITY DEPARTMENT.

The Corporation of Swansea invite tenders for :—

(a) Main Generating Station Extra High Tension and Low Tension Switchgear.

(b) Sub-Station Extra High Tension and Low Tension Switchgear.

Contractors may quote for either or both of the above sections, but tenders will only be considered under the above sections as a whole.

Copies of the general conditions, specification, and form of tender can be obtained on and after Wednesday next, the 10th instant, from Mr. C. A. L. Prusmann, Borough Electrical Engineer, on payment of one guinea, which amount will be returned on receipt of a *bonâ-fide* tender. Additional copies of the specification can be obtained at five shillings per copy, which amount will not be returned.

Sealed tenders, endorsed "Tender for Switchgear," to be delivered at my offices not later than Thursday, June 25, 1914.

The Corporation do not bind themselves to accept the lowest or any tender.

H. Lang Coath,
Town Clerk.

Guildhall, Swansea.

VICTORIAN STATE RAILWAYS.

The Agent-General for Victoria, Australia, invites tenders for the supply and delivery at the Port of Melbourne, fully inclusive of Australian Customs Duties, etc., of the following Electric Cranes :—

CONTRACT NO. 25,756.

8 50-ton Electric Overhead Travelling Cranes.
1 30-ton ditto.
3 10-ton ditto.

Specifications, conditions of contract, and forms of tender, may be obtained by *bonâ-fide* tenderers at the offices of the Consulting Engineers, John Coates and Co., Limited, 115, Victoria Street, London, S.W.

Tenders must be delivered to the Agent-General for Victoria, Melbourne Place, Strand, London, W.C., accompanied by a preliminary deposit of £25, not later than 11 a.m. on Wednesday, August 26, 1914, marked "Tender for Equipment of New Workshops, Contract 25,756, Electric Cranes."

The Government of Victoria does not bind itself to accept the lowest or any tender.

Peter McBride,
Agent-General for Victoria (Australia).

(Continued on page 439.)

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers,
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." Telephone: 3488 Leeds.
OVERHEAD LINE MATERIAL AND SUPPLIES.

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POLE PAINTS
As supplied to important Companies at home and abroad. Durable, ready-mixed, permanent colours that defy rust and exposure. Samples and prices on request.
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RIPON, England.

MILLARS' TIMBER AND TRADING CO., LTD.
PINNERS' HALL, GREAT WINCHESTER STREET, LONDON, E.C.
SUPPLY
JARRAH
THE SANITARY WOOD PAVING
REGISTERED TRADE MARK M.J.
Telegrams: "Jarrah, London." Telephone: 368. London Wall.

SIMPLEX CONDUITS, Ltd.
GARRISON LANE, BIRMINGHAM.
Makers of Simplex Steel Conduit System and
WIRES and CABLES.
BITUMEN CABLES.
TRAMCAR HEATERS.
TRAMCAR METERS.
MEASURING INSTRUMENTS.
WATERTIGHT FITTINGS FOR CAR SHEDS.
ENCLOSED (Indicating) FUSES (to N.E. Code or English Standard).
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Sole Manufacturers:
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LONDON,
E.C

THE BRITISH ACKLEY BRAKE AND SUPPLY CO., Ltd.,
WESTINGHOUSE BUILDINGS, NORFOLK STREET, LONDON, W.C.
Sole Licensors for the Manufacture of the Ackley "Adjustable" and "No Staff" Brakes in the United Kingdom, Norway, Sweden, Denmark, Belgium, Holland, and certain other territories.
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Quick Operation. Powerful Application. Easy Installation.
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Deutsche Ackley Bremsen Co., m.b.H. Charlottenburg 4-Berlin, Waitzstr. 7.
Cie. Francaise des Friens Ackley, 62, Rue St. Lazare, Paris.
BRANCH OFFICES AND AGENCIES Established at Brussels, Christiania, and Stockholm.

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THE
Tramway AND Railway World

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One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, JUNE 6, 1914.

THE "OCEAN"
ACCIDENT AND GUARANTEE CORPORATION, LTD.,
IS THE
PREMIER INSURER OF TRAMWAYS
HEAD OFFICE:
MOORGATE STREET, LONDON, E.C.

WORKING EXPENSES OF MOTOR OMNIBUSES.

The estimates of the cost of working motor omnibuses can now be checked to some extent by actual results which have been obtained in various places, and the comparative figures are of considerable interest, although they must be regarded as preliminary. As might be expected, the costs per mile run cover a wide range, as the conditions are even more varied than in the case of tramways. In the following table, the total working expenses per mile run in seven different cases have been collected, and they will be found instructive if due attention is paid to the varying circumstances of each case:—

	Pence per mile.
Hastings (1904)	11.50
Tilling-Stevens (London) (nine months ended Sept. 25, 1912)	7.063
Halifax (1912-13)	12.608*
Eastbourne (1912-13)	14.30*
London General Omnibus (1913)	6.155
Birmingham (1913-14)	9.288
Warrington (1913-14)	7.636

*Includes depreciation, interest, and sinking fund.

The first item, that of Hastings for 1904, is given as affording a rough criterion for estimating the progress that has since been effected. The detailed figures were published in our issue of February 11, 1905. It has to be borne in mind that at that time petrol only cost one-third of its present price and there was no tax on it. The total includes depreciation at 20 per cent. per annum, the figure which is now usually adopted. Only two omnibuses were in service. In the case of the Tilling-Stevens, the figures are the average for a number of petrol-electric vehicles, and they had the advantage of the electric drive. In the details petrol is given separately, the cost being 1.067d. per mile run. Depreciation is included, but apparently not a very large amount, as it is lumped together with rent, rates and taxes, to make a total of .849 of a penny. In the case of the two municipal undertakings which follow, the high totals are to a large extent accounted for by the allowances for interest, sinking fund and depreciation. In Halifax these come to 3.52d. per 'bus mile, and in Eastbourne to 3.25d. Even excluding these items, the totals are high. Details regarding the cost in the case of the huge undertaking of the London General Omnibus Company are not sufficiently complete to enable a definite statement of costs to be made, but the low total of 6.155d. is that given by a writer of an article in THE TRAMWAY AND RAILWAY WORLD, of April 9th last, who has made a close study of such facts as are available. It includes depreciation of leases and plant, reserve fund, interest, and redemption of debentures. The working costs alone, without these three items, are calculated from various figures published from time to time as 5.561d. The renewals allowance of .351d. is very small compared with the interest, sinking fund and depreciation allowed for in municipal accounts. Apart from that, the purely working costs, which two or three years ago were very high, have been brought down by improvements in the omnibuses, engineering skill, and organisation. Further, there are the advantages from working on a very large scale and from having the finest road surfaces in the world to run on. As to Birmingham and Warrington, both small undertakings, a good profit is shown before charging interest, sinking fund and depreciation, but these have to be reckoned with. The cost for petrol in Birmingham was 2.566d. per 'bus-mile and in Warrington 2.679d. The only other item nearly as high is drivers' and conductors' wages. A very large proportion of the other costs ought, however, to go down per mile run as the undertakings become more extensive. There is no reason why these should not show a reasonable profit, and apart from that they are proving of great value as feeders to the tramways worked by the same municipalities.

GLASGOW'S EXAMPLE.

What is the reason why tramway managers and chairmen of committees are not more largely given opportunities by their Corporations for visits abroad with a view to obtaining a better acquaintance with methods which might be adapted in this country? We venture to say that every pound expended in this way has been returned many times over in the advantage which Corporations have obtained from such expenditure; and it is difficult to understand the popularity of that false economy which limits far too much this expenditure. Objectives for journeys abroad already exist in the form of the biennial Congress of the Permanent International Tramway Union of the Continent and the similar annual gatherings in the United States. Regular attendants at the former are the manager and one or two representatives of the Glasgow Tramways Committee, and it is encouraging to know that their example is being followed by the London County Council, the Corporation of Leeds and others. The rulers of the "Second City" did not hesitate to send their tramways manager and the master of works to America to inspect notable bridges, in view of the Corporation's resolve to construct more bridges over the Clyde. Manchester, too, stands to gain no small advantage in dealing with the question of traffic congestion, from the tour made by Mr. McElroy in Europe and America. Glasgow has already begun to reap great practical benefit as a result of Mr. Dalrymple's study abroad, for he has set in motion a scheme for bringing about a

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reduction in car and other traffic accidents. These mishaps are a source of serious expense to all tramway undertakings, and in the United States they led to the institution of the Safety First movement. Concurrently with the publication of an article in our issue of May 9, calling attention to the need for the adoption of similar measures in this country, it would appear that Mr. Dalrymple launched his campaign by bringing his plans to the notice of the car employees at various depots. Below will be found an account of the later developments. Not the least interesting item is to be found in the manager's plan for stimulating the interest of the public by the exhibition of placards on the cars, the reading matter to be changed from time to time. As yet the movement has not claimed as much attention as is desirable in the newspapers, but that is an attainment which can easily be aimed at in the future. For instance, opportunities will arise to report Mr. Dalrymple's addresses to further meetings of the tramwaymen, at which he will be able to give some idea of the results of the increased efficiency that they have displayed in the discharge of that portion of their duty which relates to the supervision of passengers boarding and alighting. To encourage the men in this work the manager has announced his intention of recommending that they be paid a share of the savings effected by the reduction in compensation payments. Liberal use might also be made of the advertisement columns of the newspapers to enforce still further the lessons sought to be conveyed by means of the posters on the cars. Such an expenditure, regarded as the mainspring of the movement, would of itself prove profitable. Moreover, the Glasgow undertaking is in the happy position of being in sight of the liquidation of its debt, and its Common Good fund has reached an enviable sum.

"SAFETY FIRST" AT GLASGOW.

THE TRAMWAY MANAGER'S SCHEME—AN EXPERIMENT WITH MIRRORS.

In consequence of Glasgow Corporation having themselves undertaken third party accident risks in the tramways department, Mr. J. Dalrymple, the general manager, has inaugurated a "Safety First" campaign among the employees of the departments, on the lines of the movement adopted by the street railway companies of the United States. He has addressed meetings of the men at several of the depôts, and from the reception accorded to the scheme at those gatherings he is convinced that the employees generally will take the matter up enthusiastically. In order to give them an incentive to do so he states (in the course of a circular letter which has been handed to each man) that he is prepared to recommend that a proportion of any saving in the cost of meeting claims which may accrue through the efforts of the motormen and conductors be distributed among them. Valuable suggestions, it is added, have been made by the employees. It is also intended to advance the movement among the youth of the city through the educational authorities, and among the general public by a publicity campaign.

Recognising that the greatest difficulty lies in dealing with accidents which occur at the rear platform, Mr. Dalrymple says he is in sympathy with the suggestion that standing on the cars should be discontinued as soon as possible. Experiments are being conducted at present with a mirror on the rear platform, in alignment with one at the front, which will reflect not only the rear step but also the whole of the rear platform. The circular contains the following among other ways in which accidents might be reduced :—

Cars should never be started from a terminus until conductor is on the rear platform and has given the bell signal to the motorman.

Never hesitate to stop a car between stations if there has been a misunderstanding between you and a passenger. It is better to lose a little time than risk an accident.

Try, as far as possible, to prevent passengers travelling for any distance standing on the car step.

The conductor should endeavour to be as much as possible on the rear platform.

Motorman should be certain that platform is clear before starting away from a stopping place. He should never risk having an accident.

When a car has been stopped at cross streets, and is signalled over by a crossing constable, motorman should always look round before he starts.

The memorandum concludes :—"Every personal accident is the result of carelessness, negligence, or thoughtlessness on the part of some individual, and we do not want that person to be an employee of the Glasgow Corporation tramways." A poster, headed "Safety First," has been affixed at each end of the tramcars, and the wording will be changed periodically.

NEW AND PROSPECTIVE WORK.

Bradford.—Terms have been arranged by the Tramways Committee, and sanctioned by the Council, for an extension of the tramways to Baildon.

Bournemouth.—During the slack months of the present year the tramways department contemplate carrying out re-construction of the lines in Holdenhurst Road from Wellington Road to Queen's Park Corner and the doubling of this line right through, also for the laying of a double line down Richmond Hill.

Bury.—Short extensions of two lines have been decided upon by the Tramways Committee.

Cardiff.—A recommendation is made by the Tramways Committee for doubling the line in Mill Lane, at an estimated cost of £1,200, and a report is to be presented on the question of a loop for relieving the congestion at the Monument.

Glasgow.—An inspection of the Duntocher route, along which it is proposed to extend the tramways, has been made for the purpose of considering road widenings.

Huddersfield.—The Tramways Committee have decided to carry out extensive track re-construction and doubling during the ensuing year.

Leicester.—At a cost of £20,000 the tramways are to be extended *viâ* Welford Road to Aylestone Road and Clarendon Park.

Reading.—The Tramways Committee have agreed to replace nine sets of points at once. The question of laying double lines in substitution for the single lines of tramway between the Oxford Road and Wokingham Road termini has been adjourned until it becomes necessary to renew the permanent way some years hence.

York.—The Light Railway Commissioners have granted the application of the Council for powers to extend the tramway system.

MISCELLANEOUS NEWS AND NOTES.

Burnley and Omnibuses.—The Tramways Committee have called for a report on the advisability of running motor omnibuses on a number of routes throughout the borough.

The Bristol Poll.—June 13 is the date fixed for taking the poll of the ratepayers on the question "Are you for or against the purchase by the Corporation of the Bristol tramways undertaking?"

London County Council Employees' Application.—Applications on behalf of motormen and conductors relating to rates of pay, overtime payment, hours of labour, spread-over time, holidays, reliefs, and employment of spare men, have been referred to the conciliation board.

Loans Sanctioned for Traffic Facilities.—The Board of Trade have sanctioned the borrowing of £4,000 for the installation of a railless trolley system by Ardsley Council. Sanction has been given to the borrowing of £21,800 by Baildon Urban Council for the construction of tramways.

Damage to Track by Heavy Motor Vehicles.—In his annual report Mr. W. Clough, general manager of Bury Corporation Tramways, states that much more money will have to be spent on the tramway paving owing to the great amount of damage which is now caused by heavy motor vehicles. At present, he adds, there is no prospect of road authorities receiving from the Road Board any portion of the tax which is placed on motor vehicles.

Proposed Purchase of Aberdeen Suburban Tramways.—Aberdeen Council on June 1 decided to renew the agreement permitting the Suburban Tramways Company's cars to run over the Corporation's system. Councillor Smith, chairman of the Tramways Committee, announced that the committee had been approached by the company with the object of either coming to an agreement in regard to the working of the undertaking or to acquire the suburban tramways by purchase.

Manchester Tramways Parcels Department.—The receipts of this department for the year ended March 31 totalled £13,990, and after meeting the expenses there was a balance of £3,641 transferred to the tramways account. The chief items of expenditure were £7,053 for salaries and wages, and £974 for horsing. Apparently no motor vehicles are utilised. The number of parcels carried was 1,303,353, or an average of 25,064 per week, as compared with 141,715 and 6,441 respectively in 1907, when the enterprise was inaugurated.

London Omnibus Men's Demands.—By 4,075 votes to 3,820 the union employees of the London General Omnibus Company on May 29 rejected the improved conditions of work offered them as the result of the conference between the company's officials and representatives of the union. Further conferences have taken place, with the result that on June 3 Mr. A. Smith, the president of the men's union, stated that they had overcome all obstacles, and they believed that the terms which they now intended to bring before the men would be satisfactory.

Protecting Car Passengers.—At Cardiff, on May 27, the driver of a motor-car was summoned for driving a motor-car negligently, and also to the danger of the public. It was stated that the defendant passed a tramcar, which was pulling up, at 10 miles an hour. Two passengers who were getting off the car had to be restrained by the conductor, and a blind man who was leaving the pavement to board the car was pulled back to safety. The defence was that the tramcar had not stopped, and no passengers were getting on or off when the motor-car passed at a steady pace. The Stipendiary said it was obviously the duty of the motor-car driver to stop, but he thought the error was only one of judgment, and, therefore, not a case for a penalty.

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A Huddersfield Extension.—Alderman Aston, chairman of the Tramways Committee, on May 30 opened an extension of the tramways from Elland to West Vale, following an inspection of the line by Colonel Druitt, on behalf of the Board of Trade. The new line is 1 mile 30 yards long, and it links Huddersfield with the Halifax tramways system.

Modern Equipment.—On the Accrington Corporation tramways a third automatic point controller was installed during last year, the first two having proved a success. During the year 24 broken axles were replaced with forged axles of a special nickel steel. At the time of replacement the diameters were increased from 4in. to 4¾in., and the manager hopes that a much longer life will be obtained from them, "but," he adds, "sight must not be lost of the fact that the condition of the permanent way was such as to put a severe strain upon car axles." Referring to the purchase of a set of motors from Dick, Kerr, and Company, of Preston, during the past year, the manager of the Bury tramways says that these are of 40 h.p., of the inter-pole type, and embody many improvements.

Advantages of Motor Tower Wagons.—Mr. H. Pilling, general manager, Accrington Corporation tramways, has reported that the motor tower wagon, which was delivered in January last, has already proved to be of considerable advantage over the horse-drawn vehicle, as it reduces to a minimum the inconvenience to the public, stoppage in the car service, and consequent loss of revenue. Mr. W. Clough, in his annual report on Bury Corporation tramways, says:—"During the year a motor tower wagon has been purchased from Leyland Motors, Ltd. It is a 30 h.p. machine, gear-driven, and with a carrying capacity of 3½ tons. The cost was £700, and it is proving of great service in dealing with breakdowns, and by reducing the time previously spent by the workmen in travelling to and from the places where ordinary repairs are being executed."

London Electric Railway Extensions.—Speaking at the annual dinner of the official staff of the London Electric, Central London, and City and South London Railways, Mr. A. H. Stanley, the managing director, said that the schemes which were under way or in contemplation involved the expenditure of £3,000,000. The City and South London Railway, which at one time was the premier electric railway, now required to have its tunnels enlarged. On that work and the Camden Town extension £1,000,000 was going to be expended. Then the Baker Street and Waterloo line was going to Queen's Park, with through trains over the North Western Railway to Watford; the Piccadilly line to Richmond and Twickenham; and the Hampstead line from Golder's Green to Edgware.

More Omnibuses Required at Liverpool and Coventry.—It is reported that at an early date Liverpool Tramways Committee will recommend the Council to purchase probably twenty motor omnibuses. The tramways department are already running a dozen vehicles. Councillor Pridmore, chairman of Coventry Tramways Committee, has informed the Council that the motor omnibuses, which began running two days before the end of the financial year, had so far proved quite satisfactory, and the committee would have to consider the question of purchasing three more. They could utilise more omnibuses to great advantage. On the service to Earlsdon the takings were very good indeed, but probably to some extent at the expense of the tramcars. Therefore they would have to consider the curtailing of the tramcar service in the morning.

Hull's Halfpenny Fare Experiment.—The length of the halfpenny stages which are being tried experimentally for six months is from three-quarters of a mile to over a mile. The old system of a halfpenny for any distance before 9 a.m. is being continued, as is also the penny universal fare after that hour. The tramways manager reported on May 27 that for the week ended May 23, when halfpenny stages were general over the whole of the system, there was an increase of halfpenny passengers over the previous week of 196,717, and an increase over the corresponding week last year of 203,754. The receipts show a decrease of £10 12s., compared with the previous week, but an increase of £88 compared with the corresponding week last year. There were carried during the week 404,096 halfpenny passengers and 483,602 penny passengers, a total of 977,698.

Omnibus Developments Outside of Birmingham.—Mr. C. S. B. Hilton, presiding on June 3 at the annual meeting of Birmingham and District Power and Traction Company, mentioned that since the purchase by the Corporation of the company's garage in Birmingham and thirty of their omnibuses their relations with the Council continued to be very friendly, and, as the result, the agreement provides that the company's omnibuses, which would in future operate in the outside districts around Birmingham, might run through into the centre of the city, but without plying for hire therein, and at a minimum fare. This was a satisfactory arrangement for the company. The outside business showed signs of expansion, and good increases in receipts had taken place. The company had on order 40 additional omnibuses to replace those sold to the Corporation, and were building a new garage at Bearwood.

Car Maintenance at an Average Age of Twelve Years.—Mr. A. B. Slater, in his annual report on the working of Burton Corporation tramways, mentions that a return from 31 Corporation undertakings of an average age of twelve years was last year prepared and published by the Newport tramways manager, and from this it appeared that the average cost of repairs and maintenance was £71 per car per annum, compared with £74 per car per annum in Burton-on-Trent. The consumption of electrical energy per car mile amounted to 1.12 units, compared with 1.06 last year. Comparing the figures with those of 83 tramway undertakings, there were only ten having a slightly lower consumption per car mile. Mr. T. Hall, the borough electrical and tramways engineer, reports that the whole of the cars had been equipped with the new type hand brake. To minimise the number of breakdowns which occur in the winter, the resistances on the cars were being removed from underneath the cars to the platforms.

Stoke Council's Terms for Extension of the Tramways Lease.—Stoke-on-Trent Council have agreed to offer the following terms to the Potteries Electric Traction Company, in response to their request for the synchronisation of the dates of option to purchase the tramways and light railways:—The date of synchronisation to be December 31, 1940; the company to pay a wayleave of £2,000 a year from January 1, 1915, to December 31, 1927, and from such date to December 31, 1940, £3,000 per annum; to carry out track-doubling at certain places, and to construct a number of loops, at an estimated cost of £35,000; to pay £500 towards the cost of widening Hartshill Road; a fleet of at least six motor omnibuses to be worked on agreed routes; no overcrowding to be permitted; all rails to be laid or relaid to be of a weight of at least 100lbs. to the yard; the excessive noise caused by the tramway system to be forthwith abated; penalties to be imposed for breach of any of the covenants of the agreements; and in the event of the Council applying for powers to run omnibuses or other traction the company will not oppose such application.

Leeds Corporation Tramways.—It is mentioned in the annual report of the general manager that plans and estimates for the 1914 Parliamentary Bill had been prepared, and also schemes for the construction of mineral railways and sidings for the carriage of goods in different parts of the city. Thermit joints welded on renewals during the year amounted to 887. Of the total of 315 cars vestibule fronts have been fitted to 123. Side life-guards have been fitted to 192 cars. While it is very difficult to trace accidents in which the side guard has been the means of preventing serious injury, in two cases, at least, it is very probable that fatal accidents have been averted. The Maley electro-mechanical brake has been fitted to an additional 13 cars for operation on the heavy gradients, 77 cars now being so equipped. In pursuance of the policy of taking a greater portion of the traction load from the electric lighting department, two 1,500kw. rotary converters have been installed during the year, and another is in course of erection. Although 1,513,254 units less were generated at Crown Point, no corresponding reduction is shown in the power expenses. This is explained by the fact that it has been necessary to maintain stand-by plant at Crown Point, ready for immediate use in case of failure of the supply from the electricity department.

CONTRACTS AND ORDERS.

Babcock and Wilcox, Limited, have been allotted a contract for the complete equipment of the new boiler house at Edmonton (Canada) electricity works.

Albion Motor Car Company have received an order from West Bromwich Corporation for four 25 horse-power Albion chassis with a seating capacity of 24 passengers each.

Electric Motor Tower Wagon for Derby.—Edison Electric Company, Limited, have received an order from Derby Council for a motor tower wagon for the tramways department, at £680. A contract for the supply of switchboard instruments has been awarded to the British Thomson-Houston Company, at £328.

British Insulated and Helsby Cables, Limited, have received an order from the Edison Electric Illuminating Company, of Boston, for 55,000ft. of three-phase, 25,000-volt cable. The *Canadian Engineer* states that this is the first order for British cable for the United States, and it is also to be laid under the supervision of the British company.

British Rails for Sunderland.—The Tramways Committee received five tenders for the supply of 50 tons of rails. These were from two British firms, two German, and one American. The lowest tender was that of a German firm. The committee decided to recommend the Council to accept the tender of the North Eastern Steel Company, Middlesbrough, which was the next lowest.

London County Council received the following tenders for the supply of wood working machinery required for the third section of the central car repair depôt:—

W. B. Haigh, Gruban and Co., Ltd. (Accepted)	£1,372 10 0
Do. do. (alternative) (not to specification)	1,335 0 0
Buck and Hickman, Ltd.	1,485 12 6
Do. (alternative)	1,540 17 6
John Pickles and Son	1,531 10 0
Thomas Robinson and Son, Ltd.	Incomplete tender
Wadkin and Co.	do.
A. Ransome and Co., Ltd.	do.

PERSONAL.

Mr. C. B. Smith, chief engineer, Hove Electric Lighting Company, has been presented by the staff with a gold chronograph and a sovereign case on the occasion of the transfer of the undertaking to the Corporation.

Mr. J. W. Thorpe, who has had over thirteen years' experience as works foreman at Halifax, has been appointed works manager to Oldham Corporation tramways. All of the eight applicants were interviewed.

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Mr. R. O. Pickmere, who has held the position of chief engineering assistant to West Ham tramways manager during the past seven years, has resigned in order to join the firm of Geo. W. Green and Co., of Feltham, manufacturers of tramway overhead specialities.

Captain T. M. Hutchinson, who has had charge of the last two subsidy vehicle trials for the War Office, has been appointed secretary to the Mechanical Transport Committee of the Army Council. The post has been relinquished by Captain A. E. Davidson, after five years' service, consequent upon his removal to Ireland.

Mr. J. F. C. Snell, president of the Institute of Electrical Engineers, and Mr. W. J. Pratten, formerly engineering manager of Harland and Wolff, Limited, have been appointed by Belfast Council to furnish a joint report on the condition of the plant at the Corporation electricity works, and the steps to be taken to extend the undertaking generally. Mr. Snell's fee is 150 guineas, and Mr. Pratten's fee 100 guineas.

Mr. E. S. Pinkerton, on June 3, was voted by Belfast Corporation an increase of his salary from £375 to £500 per annum for his duties in connection with the city surveyor's department and the supervision of the maintenance of the tramways permanent way. £200 of the amount is to be paid by the Tramways Committee. Councillor Squire advocated that a tramways engineer should be engaged from England to do the permanent way work.

Mr. A. S. Parsons, engineering assistant to Mr. H. E. Stilgoe, the Birmingham city engineer, on May 23 read a paper on "Recent Highway Bridges in Birmingham," at a meeting of the West Midland District of the Institution of Municipal Engineers, held in that city. During fourteen years' service Mr. Parsons has been engaged on tramway construction to the value of £250,000, the construction of eleven bridges, an 8,000kw. generating station, and many other undertakings.

Mr. E. G. Mawbey, borough and tramway engineer, Leicester, was, on May 26, on the recommendation of the Tramways Committee, voted an honorarium of £500 out of the tramway revenue for special services in connection with tramway construction, the erection of buildings, and the maintenance of permanent way during the last twelve years. Alderman Flint observed that the track construction entailed a great deal of work by Mr. Mawbey, who constructed it at a cost of £17,000 less than the Parliamentary estimate for the contract price. The capital expenditure was something like £550,000. Mr. Mawbey's salary is £1,250.

Mr. A. Bruce Anderson was one of the passengers who lost their lives by the disaster to the *Empress of Ireland* on May 29. He was managing director of Ferranti, Limited, a director of Bruce Peebles and Co., Limited, chairman of the British Electrical and Allied Manufacturers' Association, and a member of the Council of the Institution of Electrical Engineers. Mr. Anderson joined the business of Mr. S. Z. de Ferranti in 1892, as an accountant, at the age of twenty-two.

FINANCIAL REPORTS AND MEETINGS.

Brazilian Traction, Light, and Power Company.—The accounts for the 18 months ended December 31 show, after paying five dividends on common shares of 1½ per cent. each, a surplus carried to profit and loss of $3,012,997. The surpluses of the company and subsidiary undertakings amounted to $15,028,144.

Coventry Corporation Tramways.—The accounts of the Coventry Corporation tramways, of which Mr. T. R. Whitehead is general manager and engineer, show a fairly satisfactory result, but considerable increase in expenditure for the year ended March 31, 1914, has more than balanced the increase in revenue. The chairman of the Committee, Councillor M. K. Pridmore, observed that nothing had yet been allowed for track renewal, but that they would have to expend a large amount in the near future. The summary of the accounts is as follows:—

Total receipts	£43,484
Total working expenses	29,116
Balance carried to net revenue	£14,368
Bank interest	478
	£14,846

Out of this the following charges have been met:—

Interest on capital	£8,506
Contribution to sinking fund	5,230
Expenses raising funds	414
Balance carried to appropriation account	419

The total length of the tramways is 13 miles. Other particulars are appended:—Average expenses per car mile, 9.271d.; average working expenses, 6.208d.; total car miles, 1,125,705; total number of passengers carried, 8,407,719; number of units per car mile, 1.47; works cost per unit, .54d.; percentage of working expenses to receipts, 66.9; average revenue per mile of single track, £2,714.

Birmingham District Power and Traction Company.—The revenue for 1913 was £126,416, compared with £115,698 for 1912, and the expenses amounted to £64,157, compared with £55,589. After adding £4,000 to the renewals fund and providing for the sums due to the local authorities, the surplus was £58,258, and £109 was brought forward. Debenture interest absorbed £26,889, and sinking fund charges £5,428. A dividend of 3½ per cent. is proposed on the preferred ordinary shares, adding £2,000 to the reserve, and carrying forward £261.

Manchester Corporation Tramways.—The total amount borrowed for the construction of the tramways system, which has a route mileage of 78 miles and a single track mileage of 136 miles, has been £2,130,903. Since 1902 the sum of £815,090 has been paid in relief of rates, £491,409 has been paid into the sinking fund (of which £489,903 has been applied in reduction of the loans) and £468,952 has been accumulated for renewals and depreciation. Running powers are being exercised over 14 miles of line outside the city. There are 662 cars, 494 being fitted with covered tops, 351 cars are single track and 266 double track.

Leeds Tramways.—Mr. J. B. Hamilton, in his report on the Leeds Corporation tramways, gives the following summary of income and expenditure and the manner of application of the gross profit:—

	1913-14	1912-13
	£	£
Traffic revenue	425,516	407,551
Sundry revenue	3,939	3,979
Total	427,455	411,531
Working expenses	226,382	213,817
Gross profit	201,072	197,713
Against which is charged:—		
Interest on capital	42,176	42,196
Less bank interest and dividends	8,353	7,511
	33,822	34,685
Income tax	5,343	5,020
Rental of Morley Light Railways	3,223	3,216
Sinking fund	51,932	49,922
Permanent way renewals	31,576	41,732
Parliamentary costs and Sovereign St. estate	5,169	403
Revenue contribution to capital outlay	—	1,337
	131,068	136,338
Appropriated in relief of rates	70,004	61,374

The Corporation now own 109 miles of track and they lease from Morley Corporation 4.75 miles, and they have also a railless traction route of 3.75 miles. The energy consumption per car mile, including transmission and conversion losses, was 1.776 units. The total coal consumption was 29,201 tons, and per unit generated 4.903 lbs. The average traffic revenue per car mile was 11.042d., and average working expenses per car mile (including power works cost) 5.902d., excluding power works cost 5.110d., and including total power cost and permanent way renewals 7.455d., passengers carried aggregated 93,679,774, while the average fare paid per passenger was 1.081d.; total receipts per passenger 1.095d.; total expenses per passenger .916d.; average net surplus per passenger .179d.; average number of passengers per car mile 10.17; average journeys per head of population per annum 178; number of cars 315. Since 1894 £912,198 has been transferred in relief of rates, and £534,630 has been set aside for sinking fund. The total capital outlay has been £1,511,588.

Birmingham Corporation Tramways.—The accounts of the tramways department for the year ended March 31 last shows that the undertaking has again fully met the expectations of the Tramway Committee and of the public. The department is still in a stage of transition and expansion, and the conditions are consequently less favourable than they will be under normal circumstances. The summary of the revenue account is appended:—

Dr.		Avg. per car mile.
To Power expenses	£113,742	1.913d.
Traffic expenses	183,118	3.080d.
General expenses	57,581	.969d.
General repairs and maintenance	88,698	1.492d.
Superannuation allowances	203	.003d.
Health and unemployment insurance	2,162	.036d.
Total expenditure	445,507	7.491d.
Balance carried to profit and loss account	189,963	
Total revenue	£635,470	

Cr.		Avg. per car mile.
By Traffic receipts	£628,016	10.564d.
Other receipts	6,918	.116d.
Contributions for superannuation	535	.009d.
	£635,470	10.689d.

After paying interest on loans, £68,477, and £53,804 to sinking fund for repayment of mortgages and other items there was a balance of £44,071. The statistical information included the following:—Capital expenditure, £2,334,437; route miles of track 65 miles 46 chains; traffic revenue, £628,016; average traffic per car mile, 10.563d.; working expenses, £445,507; average working expenses per car mile, 7.494d.; car miles, 14,268,244; average number of miles per car per day, 79.77; average number of car hours per day, 10.16; passengers carried, 146,930,986; percentage of working expenses to receipts, 70 per cent.; units per car mile, 1.70.

The motor omnibus account showed that £7,515 had been expended in providing those vehicles, which began running on July 19, 1913. The revenue account to March 31 last was:—

Expenditure.	Avg. per 'bus mile.	
To Petrol	2.566d.	£1,407
Superintendence	.360d.	197
Traffic expenses	3.132d.	1,717
General expenses	.608d.	333
Repairs and maintenance	2.622d.	1,438
Total expenditure	9 288d.	5,092
Balance carried to profit and loss account		1,683
		£6,775

Income.	Avg. per 'bus mile.	
By Traffic receipts		£6,761
Other receipts		14
	12 357d.	£6,775

The omnibuses carried 748,500 passengers and ran 129,847 miles, besides 1,743 miles for testing purposes.

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Yorkshire (West Riding) Tramways.—An interim dividend of 3 per cent. (being at rate of 6 per cent. per annum) has been declared on account of dividend accrued on the 6 per cent. cumulative preference shares, payable July 1.

Glasgow Tramways Financial Year.—The number of passengers carried during the year ended May 31 exceeded that for the previous year by over 25 millions, and there was an increase of £71,038 in the traffic receipts. At each of the fares, ranging from ½d. to 4d., the returns show an advance in the number of passengers, the increase in the case of the halfpenny fare being 19½ millions. The following are the details :—

Average track mileage open during year (single), 194 3-16.
Car mileage, 24,403,482 ; increase, 1,068,474.
Traffic receipts, £1,078,691 7s. 2d. ; increase, £71,038 9s. 8d.
Traffic receipts per car mile, 10.609d ; decrease, .245d.
Traffic receipts per passenger, .769d ; decrease, .007d.
Passengers carried, 336,654,624 ; increase, 25,174,538.
Passengers carried per car mile, 13.795 ; increase, .447.

The following statement gives the number of passengers carried at each fare :—

	Year to May 31, 1914.	Year to May 31, 1913.
½d. ...	211,462,484	191,944,261
1d. ...	91,386,573	87,676,208
1½d. ...	21,597,123	20,354,233
2d. ...	6,586,923	6,191,033
2½d. ...	2,938,948	2,761,992
3d. ...	1,369,808	1,317,543
3½d. ...	1,141,967	1,076,768
4d. ...	170,998	158,048
	336,654,624	311,480,086

(Continued from page 434.)

SOUTH INDIAN RAILWAY COMPANY, LTD.

The South Indian Railway Company, Limited, are prepared to receive tenders for the supply of

Carriage Fittings (Broad Gauge). Comprising Wrought Iron and Steel, Hardware, Glass, Screws, and Sundries.

Specifications and forms of tender may be obtained at the Company's Offices.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Company, Limited, marked "Tender for Carriage Fittings," must be left with the undersigned not later than 1 o'clock on Wednesday, June 24, 1914.

The Company are not bound to accept the lowest or any tender.

A charge, which will not be returned, will be made of 20s. for each copy of the specification.

Copy of the drawings may be obtained on payment at the offices of Robert White, Esq., M.Inst.C.E., Consulting Engineer to the Company, 3, Victoria Street, Westminster, S.W.

By order, V. E. DE BROE, M.Inst.C.E.,
for Managing Director.

Company's Offices,
91, York Street, Westminster, S.W.,
June 3, 1914.

WALTHAMSTOW URBAN DISTRICT COUNCIL.

ELECTRICITY DEPARTMENT.

Contract Z.—E.H.T. Cable.

Contract No. 27.—Stoneware Conduits.

The above Council invite tenders for the supply and delivery of E.H.T. Cable and Stoneware Conduits.

Specifications and tender forms may be obtained from Mr. G. R. Spurr, Electrical and Tramways Engineer, Electricity Works, Priory Avenue, Walthamstow, by depositing the sum of £1, which will be returned on receipt of a *bonâ-fide* tender, and to the successful tenderer on the completion of the contract.

Sealed tenders, upon the forms supplied, endorsed "Tender for E.H.T. Cable (or Conduits)," must be delivered by post only to the undersigned not later than 12 o'clock noon on Friday, June 12, 1914.

The Council do not bind themselves to accept the lowest or any tender.

C. SYDNEY WATSON,
Town Hall, Walthamstow, Clerk to the Council.
June 2, 1914.

DICK, KERR & CO.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

WEEKLY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended May 30 give total receipts of £230,423, or £383 less than in the corresponding week last year. The total length of track was 2,803 miles, or 24 more than for the corresponding week. Receipts were at the rate of £82 11s. 6d. per track mile, a decrease of 16s. 9d. as compared with the corresponding week of last year.

THE BRITISH ELECTRICAL FEDERATION.

The traffic statement for the week ended May 29, 1914, shows that the receipts from tramways and railways amounted to £39,585, as compared with £43,000 in the corresponding week last year, and from omnibuses £14,398, as compared with £7,698, making a total of £53,983, as compared with £50,704. The tramway and railway route mileage was 429.82 as compared with 428.47. Upon such of the services as were working both last year and this year the receipts show a decrease of £3,303 upon the week.

RAILWAYS OF THE UNITED KINGDOM.

The summary of the official traffic returns of the fifty principal railways of the United Kingdom for the week ended May 31, which included Whitsun traffic, gives a total of £2,603,878, which was earned on 22,161 miles, being at the rate of £117 9s. 11d. per mile of line open. For the corresponding week of 1913 the receipts of the same lines amounted to £2,358,305, with 22,100 miles open, or £106 14s. 2d. per mile. There was thus an increase of £245,573 in receipts, an increase of 61 in mileage, and an increase of £10 15s. 9d. in receipts per mile. Thirty-six of the returns distinguish between the receipts from passenger and goods traffic, and these show an increase of £254,719 (or £1 11s. 4d. per mile) in the passenger receipts and a decrease of £9,516 (or 12s. per mile) in the receipts from goods traffic. The aggregate receipts of the fifty railways since the beginning of the year amounted to £48,135,074, in comparison with £48,526,494 last year, a decrease of £390,520.

COPPER AND ALUMINIUM MARKET.

June 5, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

	Friday, June 5.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	61 15 0 ..	63 0 0 ..	65 17 6
,, ,, (three months)	62 7 6 ..	63 2 6 ..	65 15 0
Electrolytic Copper—bars or ingots ..	65 0 0 ..	66 0 0 ..	70 10 0
Aluminium—bars or ingots	83 0 0 ..	83 0 0 ..	91 0 0

COAL MARKET.

June 5, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

	Friday, June 5.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	s. d.
Best Admiralty Welsh (large)	25 0 ..	25 0 ..	26 0	
Best Seconds..	24 0 ..	24 0 ..	25 3	
Ordinary Drys	21 6 ..	21 6 ..	22 9	No Quotations owing to transport workers' strike.
Best Washed Nuts	20 6 ..	20 6 ..	21 6	
Best Washed Peas	19 6 ..	19 6 ..	20 0	
Cardiff, f.o.b.—				
Best Admiralty (large) ..	20 6 ..	20 6 ..	21 6 ..	18 0
Best Seconds	19 6 ..	19 6 ..	20 9 ..	17 3
Ordinary Drys	17 0 ..	17 0 ..	18 3 ..	15 3
Best Washed Nuts	16 0 ..	16 0 ..	17 0 ..	..
Best Washed Peas	15 0 ..	15 0 ..	15 6 ..	..
Newcastle, f.o.b.—				
Best Steams	15 6 ..	14 6 ..	15 0 ..	12 6
Best Seconds	12 6 ..	12 6 ..	14 0 ..	11 0
Smalls	8 6 ..	8 6 ..	9 0 ..	9 6

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregates. Wks.	Aggregates. 1913-4.	Increase or Dec.
Anglo-Argentine	May 27	£58,260	£55,557	21	£1,182,272	+ £6,986
Auckland..... (28 days)	May 8	21,662	22,268	45	226,892	+ 5,419
Ballarat and Bendigo	Mar. 29	2,756	2,215	52	49,969	— 1,242
Brazilian St. Rly. Mlrs	April	44,765	50,595	39	473,635	+ 71,209
Brazilian Traction.....	May 30	90,492	92,800	22	2,076,529	+ 84,564
Brisbane	May	26,560	29,860	21	140,385	+ 14,995
British Columbia .....$	April	706,633	698,708	48	7,450,590	+ 841,056
Buenos Aires Pt. & City	April	6,659	6,428	17	29,804	+ 3,418
Buenos Aires Lacroze..	May	45,274	44,890	48	490,428	+ 5,927
Calcutta.....Rs.	May 30	58 896	62,792	21	14,74,846	+ 69,746
Cape Town	April	12,175	13,408	17	55,388	+ 3,926
Carthagena & Herrerias	May	2,051	2,202	22	12,391	— 2,782
Cordoba	March	12,668	13,499	52	159,207	+ 13,593
East India	April	1,760	1,837	39	17,239	+ 717
Kalgoorlie.....	April	3,073	2,820	17	9,805	— 1,508
La Plata.....	May	5,130	4,727	21	24,683	— 2,042
Lima.....	April	32,930	34,200	17	140,583	+ 6,910
Lisbon ..... Mlrs.	March	...	160,592	...	...	...
Madras (14 days) Rs.	May 31	28,339	27,766	21	289,984	+ 21,719
Melbourne	April	65 500	65,000	17	282,500	+ 500
Mexico .....$	April	583,558	594,958	17	2,345,807	+ 264,842
Montevideo.....	May	29,831	29,016	31	229,192	— 401
Para	May 3	4,030	3,581	22	76,363	— 14,561
Port Elizabeth.....	April	4.357	3,758	17	16,633	+ 245
Puebla ..... $	April	60,700	65,100	17	263,500	+ 31,200
Rangoon Tramways..	April	5.351	5.267	17	22,014	+ 675
Shanghai .....$	May 27	19,086	25,400	21	549,600	+ 84,096
Singapore .....$	May 30	11,324	11,933	21	263,643	+ 9,707
Toronto .....$	April	760,676	830,299	17	3,292,255	+ 263,847
Winnipeg.....$	April	323,563	337,414	17	1,418,875	+ 94,366

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks	1913-4.	Increase or Dec.
Aberdeen Corporation.	May 31	£2,481	£2,797	+ £316	52	£84 273	+ £5,170
Accrington Corp.	" 27	554	559	+ 5	8	4,859	+ 159
Ayr Corporation	" 30	299	345	+ 46	2	799	+ 113
Bath Electric	" 27	952	1,065	+ 113	21	17,668	+ 1,442
Birkenhead Corp.	" 31	1,471	1,223	— 248	8½	11,226	+ 85
Birmingham Corp.	" 30	11,693	12,522	+ 829	9	108,972	+ 7,383
Blackburn Corporation	" 27	1,320	1,233	— 87	9	12,389	+ 1,089
Blackpool Corporation	" 28	942	778	— 164	9	10,222	— 232
Bolton Corporation	" 31	2,703	2,742	+ 39	9	25,340	+ 1,470
Bournemouth Corp.	June 3	1 959	2 779	+ 820	9	19,608	+ 1,897
Bradford Corporation.	May 31	6 089	5,920	— 169	9	55,090	+ 2,933
Brighton Corporation.	" 31	1.059	1 089	+ 30	8½	9,352	+ 758
Bristol	" 29	8,485	8,370	— 115	21½	169,014	+ 13,639
British Elec. Federatn	" 29	50.704	53,983	*	...	...	...
Burnley Corporation	" 30	1,649	1,551	— 98	9	15,415	+ 532
Burton-on-Trent Corp	" 24	270	302	+ 32	8	2,322	+ 113
Bury Corporation.	" 31	1,341	1,318	— 23	8½	12,389	+ 192
Cardiff Corporation.	" 16	3,131	2,744	— 387	6	18.866	+ 1,067
Chatham and District.	" 28	952	830	— 122	21	18,318	+ 158
Chesterfield Corp.	" 14	350	251	— 99	6	1,886	+ 252
Colne Corporation	" 24	273	310	+ 37	...	...	...
Cork Electric.	" 28	528	505	— 23	21	10 050	+ 224
Croydon Corporation	" 22	1,642	1,575	+ 243	7	13,564	+ 1,175
Darlington Corporation	" 23	241	256	+ 15	8	2,064	+ 114
Derby Corporation	" 30	1,004	989	— 15	8½	8,919	+ 345
Dover Corporation	" 30	253	222	— 31	9	2 041	+ 61
Dublin & Lucan	" 23	151	143	— 9	21	2,718	— 51
Dublin United	" 29	6 660	5,651	— 1,009	22	117,325	— 3.5:0
Dundee City	" 27	1,301	1,275	— 26	1½	2,252	+ 5
East Ham Corporation	" 30	988	988	Nil	8½	8.974	— 115
Exeter Corporation	" 29	355	311	— 25	9	3,039	+ 210
Gearless Motor 'Buses.	" 30	...	495	...	23	10.140	...
Glasgow Corporation	" 30	21,127	21,946	+ 819	52	1,076,153	+ 73,058
Glossop (U.Elec.Supply	" 30	126	115	— 11	22	2 693	— 65
Halifax Corporation	" 26	2,169	2,045	— 124	8	17,559	+ 538
Hastings & District.	" 27	1,032	962	— 70	21	17,457	— 244
Huddersfield Corp.	" 30	2,183	2,161	— 32	9	2),183	+ 1,347
Hull Corporation	" 20	3,078	2,966	— 112	9	27,151	+ 216
Ilford U.D.C.	" 30	479	459	— 20	8	4,311	+ 336
Ilkeston Corporation	June 3	140	156	+ 16	9	1,230	+ 17
Ipswich Corporation	May 30	425	446	+ 21	10	3,966	+ 235
Isle of Thanet	" 30	662	585	— 77	35	13,472	+ 557
Kilmarnock Corp.	" 30	174	166	— 8	2	411	— 41
Lanarkshire	" 28	1,725	1,911	+ 186	21	39,857	+ 5,489
Lancashire United	" 27	1,617	1,569	— 48	21	33 914	+ 3,797
Leeds City	" 30	8,621	8,127	— 494	9	73,470	+ 2 699
Leicester Corporation.	" 31	3,039	2,893	— 146	22	61,799	+ 3,055
Leith Corporation	" 30	732	740	+ 8	2	1,672	+ 78
Leyton U.D.C.	" 28	1,453	1,330	— 123	8	11.160	+ 864
Liverpool Corporation.	" 30	13.191	13.493	+ 302	21½	278,417	+ 13.816
Llandudno & Colwyn B.	" 29	263	257	— 6	26	4 997	— 463
London County Council	" 27	42 630	43,762	+ 1,132	8	360,083	+ 16,668
London Gnl. Omnibus.	" 30	74,533	67,732	— 6,801	22	1,513,580	+ 24 409
London United	" 29	7.89)	5,969	— 1,921	22	126.764	+ 1,396
Lowestoft Corporation	" 30	183	196	+ 13	34	6,260	+ 666
Maidstone Corporation	" 28	205	187	— 18	9	1,840	+ 131
Manchester Corp.	" 30	17.904	17,556	— 352	9	155,510	+ 4,872
Met. Elec. Trys.	" 29	10.187	9,102	— 1,085	22	191.587	+ 2,731
Nat. Steam Car Co., Ld.	" 31	4,855	6,824	+ 1,939	30	122.466	+ 52,320
Nelson Corporation.	" 23	216	220	+ 4	7½	1,565	+ 45
N'castle-on-Tyne Corp.	" 30	4,845	5,134	+ 489	9	44,885	+ 4,573
Newport (Mon.) Corp.	" 30	781	792	+ 61	9	7,177	+ 677
New St. Helens & Dist.	" 27	843	816	— 27	48	39,957	+ 3,010
Northampton Corp	" 29	627	544	— 83	8½	4,963	+ 39
Nottingham Corp.	" 28	3,375	3,243	— 132	8½	29.640	+ 571
Oldham Corporation	" 31	2,153	2,287	+ 134	10	22,661	+ 1,683
Portsmouth City	" 30	2,185	2,076	— 89	9	19 895	...
Preston Corporation	" 27	848	810	— 38	9	7,876	+ 65
Provincial	" 30	1,934	1,804	— 130	34	61,311	+ 3,200
Reading Corporation	" 28	703	659	— 44	8	5 909	+ 393
Rhondda	" 23	1,084	1,155	+ 91	21	25.720	+ 1,098
Rochdale Corporation	" 30	1,589	1,552	— 37	9	14,453	+ 554
Rotherham Corp.	June 3	962	1,382	+ 420	9	9,275	+ 475
Salford Corporation	" 1	5,229	5,171	— 58	8	45 924	— 316
Sheffield Corporation	May 31	7,427	7,624	+ 197	9½	73.146	+ 2 5:8
Southampton Corp.	" 27	1,333	1,260	— 73	8	10.808	+ 475
Southend-on-Sea Corp	" 27	864	918	+ 50	9	7,706	+ 1,303
South Met. Trys.	" 29	983	1,196	+ 213	22	21,923	+ 6,241
South Shields Corp.	" 30	709	742	+ 33	8½	6,557	+ 822
Sunderland Corp.	" 31	1,420	1,425	+ 5	9	12,581	+ 500
Sunderland District	" 27	548	575	+ 27	30	17.266	+ 1,422
Swindon Corporation	" 27	165	165	Nil	8	1,431	+ 150
Torquay	" 28	532	516	— 66	21	10 254	+ 5
Trys. (M.E.T.) 'Buses	" 30	4.379	9,018	+ 4,639	22	187.991	...
TynesideTrys. & Tmrds	" 27	527	522	— 5	21	10,982	+ 632
Wallasey Corporation	" 30	1,233	1,257	+ 24	8½	10 981	+ 640
Walsall Corporation	" 30	629	616	— 13	22	13,447	+ 111
Walthamstow U.D.C.	" 30	834	759	— 75	9	7,121	+ 700
Warrington Corp	" 24	448	439	— 9	8	3,657	— 47
West Ham Corporation	" 28	2,853	2 779	— 74	8	23,934	+ 978
Wigan Corporation	" 28	1,515	1 518	+ 3	9	13.773	+ 374
Wolverhampton Corp	June 3	1,070	1 602	+ 532	10	10.484	+ 546
Yorkshire (W. Riding)	May 31	1,503	1,487	— 16	22	31.540	+ 649

* From such of the services as were working both last year and this year the receipts show a Decrease of £3,393 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London.	May 30	£4,552	£4,839	+ £287	22	£110 804	— £3.434
City and South London	" 30	2,529	2 641	+ 112	22	60.116	— 4.201
Liverpool Overhead.	" 31	1,736	1,841	+ 105	22	37,207	+ 1,370
London Electric.	" 30	12.640	13,690	+ 1,050	22	314.895	+ 1,570
Mersey	" 30	2,094	2.179	+ 85	22	49.531	+ 120
Metropolitan	" 31	17.358	19,389	+ 2,031	22	395,425	+ 33,623
Metropolitan District	" 30	12.640	18,251	+ 611	22	289 166	+ 911

The Tramway & Railway World can be obtained, post free, at the following rates:—

For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For places abroad—Thirty Shillings per annum.

Tel. No.: 2948 Gerrard.
Telegraphic Address: "Tramigre," London.

AMBERLEY HOUSE, NORFOLK ST., W.C.

TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, June 5.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	69½ — 71½
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref	+ ⅛	4⅜ — 5
5	Do. 5½% Cum. 2nd Pref.	+ ⅛	4⅛ — 4⅜
100	Do. 4% Deb. Stk. Red.	...	99½ — 94½
100	Do. 4½% Deb. Stk. Red.	...	99½ — 101½
100	Do. 5% Deb. Stk. Red.	+ ⅛	91½ — 96½ xd
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 —106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅛ — ⅜
1	Do. 5% Cum. Pref	...	⅛ — ¾
100	Do. 4½% 1st. Mort. Deb. Stock, Red.	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	...	84½ — 86½
10	Blackpool and Fleetwood Tramroad Co.	...	14 — 15
	Bombay Elec. Supply and Trams. Co., Ord.	...	14 — 15
10	Do. do. 6% Cum. Pref.	...	10¾ — 11¾
100	Do. do. 4½% Db. Stk Rd.	...	94½ — 96½
$100	Brazilian Traction Light and Power Co. Lim.	...	80 — 82
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	...	6⅝ — 7⅛ xd
5	Do. do. 5% Cum. Pref	...	4¾ — 5¼ "
100	Do. do. 4½% 1st Deb Stock, Red.	...	98 —101
10	Bristol Tramways and Carriage Co.	...	6¾ — 7
10	Do. do. 6% Cum. Pref.	...	6⅞ — 7⅛
100	Do. do. 4% Deb. Stock	...	100 —102
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	...	110 —114
100	Do. Pref. Ord. Stock	...	103 —107
100	Do. 5% Cum. Perpetual Pref. Stock.	...	103 —106
100	Do. 4½% 1st Mort. Debs.	...	97 —100
40	Do. 4½% Vancouver Power Debs.	...	94 — 98
100	Do. 4½% Perpetual Cons. Deb. Stk.	+ ⅛	94 — 96
100	British Elec. Traction Co., Lim., 6% Cum. Pref.	...	88½ — 91½
100	Do. 7% Non-Cum. Pref.	+ ⅜	58 — 61
10	Do. 6% Pref. Ord. Non-Cum.	+ ⅛	14⅛ — 16⅛
100	Do. Deferred Ord. Stock	+ 1	7 — 9
100	Do. 5% Perpetual Debenture Stock.	..	92½ — 94½
100	Do. 4½% Second Debenture Stock, Rec	...	77 — 80
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	73 — 78
100	Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb	...	99½ —101½
5	Calcutta Tramways Co., Limited, Ord.	...	6½ — 7
5	Do do. 5% Cum. Pref.	...	5 — 5¼
100	Do. do. 4½% 1st Deb. Stock, Red	...	97 —100
1	Cape Electric Tramways, Ld.,	...	⅝ — ¾
10	Carthagena and Herrerias Steam Tramways Co., Lim	...	2¾ — 3⅛
100	Do. 5% Debs., Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co. (1904), Lim.	...	5⅜ — 5⅝
100	Do. 4% Debenture Stock Red, 1988	...	92 — 97
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.	...	90 — 94
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	...	91 — 94
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	— 6⅞
10	Dublin United Trams. Co. (1896) Lim. Ord.	— ⅛	— 10⅞
10	Do. do. 6% Pref.	— 1/16	— 12⅝
100	Do. do. "A" Red.	...	— 80¼
100	Do. do. Deb. Stock "B" Red.	..	— 80
10	Gateshead & Dist. Trys. Co., Ord.	...	8½ — 9
10/-	Hastings & Dist. Electric Trams. Co., Ld., Ord.	...	⅜ — ⅝
1	Do. do. 6% Cum. Pref.	...	⅜ — ⅝
100	Do. do 4½% Deb. Stk. Red.	...	65 — 70
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	— 2½	83½ — 87½ xd
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.)	...	93¼ — 97¼
10	Imperial Tramways, Ord.	...	3 — 3½
10	Do. do. 6% Cum. Pref.	...	6¼ — 6¾
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.	..	2 — 2¼
100	Do. 4% Debenture Stock	...	73 — 78
1	Kalgoorlie Elec. Trams., Ltd.	...	...
100	Do. do. 5% "A" Deb. Stk.	...	84 — 89
100	Do. do. 6% "B" do.	...	10 — 90
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.	...	⅜ — ½
10	Lanarkshire Tramways Co.	...	9⅛ — 10¾
100	Lancashire United Tramways, 5% Prior Lien Deb.	...	87 — 89
1	Lisbon Electric Trams., Lim., Ord.	...	1⅜ — 1½
1	Do. 6% Cum. Pref.	...	⅞ — 1⅛
100	Do. 5% Mort. Debs.	...	95 —100
1	London and Suburban Trac. Co., Lim., Ord.	...	⅛ — ⅜
100	London General Omnibus Company, Limited, 4½% Deb.	...	99 —101
100	Do. Do. 5% Cum. Inc. Deb. Stk. Red.	...	88 — 91
100	London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red	...	56 — 60
100	Madras Electric Trams. (1904) Lim., 6% Cum. Pref.	...	4¾ — 5¼
5	Do. do. 5% Deb. Stk., Red.	...	101 —103
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	78 — 81
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	...	105 —108
$1,000	Do. do. 5% Bds.	...	98¾ —100¼
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	⅛ — 1/16
100	Metropolitan Elec. Trms. Ltd. 4½% Deb Stock, Red.	...	87 — 90
100	Do. 5% Deb. Stock, Red.	...	85¼ — 88½
100	Mexico Tramways Co., Common Stock	— 2	69 — 73
500	Do. Gen. Con. 1st Mort. Gld. Bonds	+ 1	79 — 83
100	Do. 6% 50-yr. Mort. Bonds	+ 1½	77 — 81
...	Michigan United Railways 5% 1st Mort. Gld. Bonds	...	90 — 92
100	Montreal Street Railway, Sterling 4½% Debs. (1922)	...	98 —100
100	Do. 4½% Sterling Debs, (1932)	...	97 — 99
1	National Steam Car Co. Ltd.	...	⅜ — ½
10	Oldham—Ashton and Hyde Elec. Ord.	...	6 — 6¼
10	Do. do. 5% Cum. Pref.	...	5⅜ — 6⅜
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	3⅞ — 4¼
5	Do. do. 6% Cum. Pref.	...	4 — 4½
1	Perth (W.A.) Elec. Trams., Ld., Ord.	...	...
1	Potteries Electric Traction Co., Ltd., Ord.	...	⅜ — ⅝ xd
1	Do. 5% Cum. Pref.	...	⅛ — ⅜
100	Do. 4½% Debenture Stock, Red.	...	81¾ — 84½
1	Provincial Tramways, Lim., Ord.	...	⅛ — ⅜
10	Do. 5% 1st Deb. Stock	...	98 —103
...	Puebla Tramway, Light & Power Co., Prior Lien 5%	...	73 — 78
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.	...	5 — 5½
100	Do. do. 4½% 1st Mt. Db. Stk	...	95 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	87 — 89
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt 30-yr, 5% Gd. Bds.	...	97½ — 99½
100	Do. do. 5% 5-yr. Mort. Gold Bonds	+ 1	88¾ — 90½
$500	Sao Paulo Tr. Light & Power, Co. 5% 1st Mort. Debs., 1928	— 2	94 — 98
100	Do. do. 5% Perp. Cons. Debs.	+ 1	97 —100
10	Shanghai Elec. Construction Co.	...	12½ — 13½ xd
100	Singapore Elec. Tramways Lim., 5% Debs. Red	...	89 — 94
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref.	...	...
100	Do. do. 4% Deb. Stk.	...	66 — 70
...	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	95 — 97
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	97 — 99
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	81 — 83
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	90 — 92
5	United Elec. Tramways of Monte Video, Ord.	...	4½ — 5⅛
5	Do. do. 6% Cum. Pref.	...	4⅞ — 5¼
100	Do. do. 5% 1st Deb. Stk. Red.	...	92½ — 95½
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	93½ — 95½
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	⅜ — ⅝
5	Do do 6% Cum Pref.	— ⅛	4¼ — 4¾
100	Do. do. 4½% 1st Deb. Stock. Red.	...	84 — 87

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

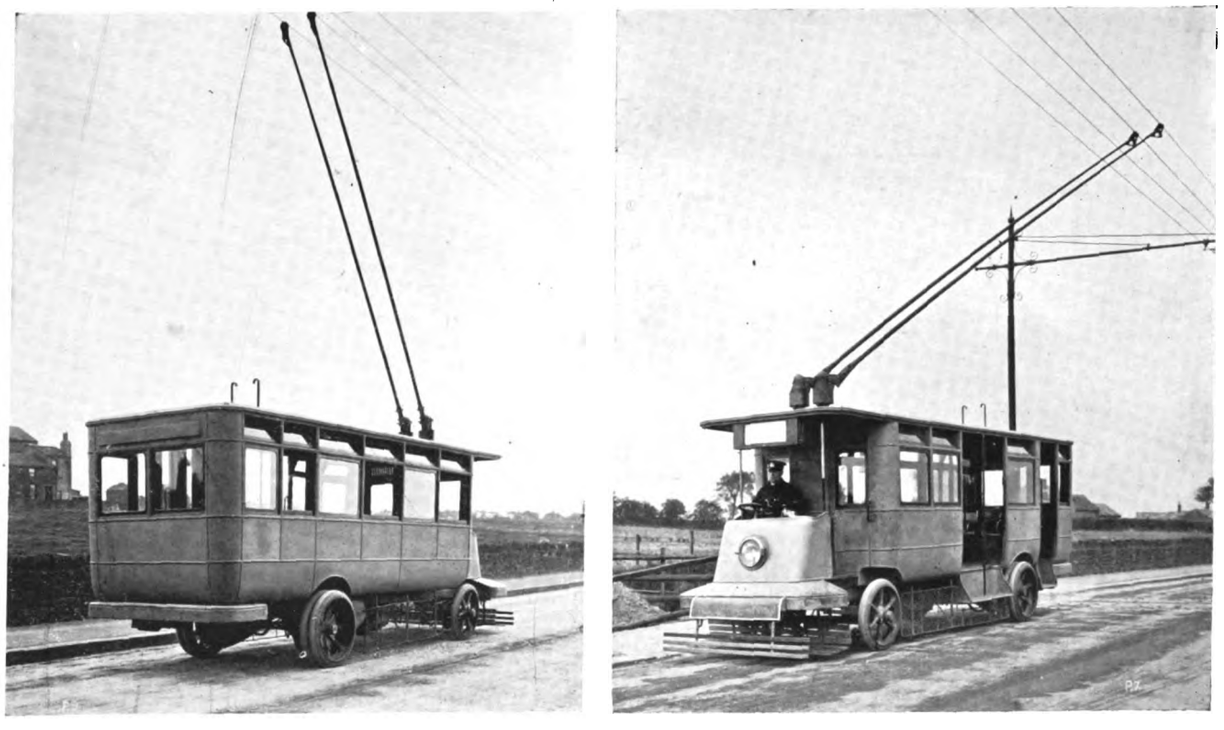
FOUNDED 1892. LONDON, JUNE 11, 1914. VOL. XXXV.

NEW TYPE OF RAILLESS ELECTRIC CAR.

ADOPTION OF A LIFE-GUARD.

The accompanying illustrations of a new and, in some respects, novel type of railless car afford evidence that the R.E.T. Construction Company—the pioneers of railless trolley car traction in this country—are not content to rest satisfied with tramcar and omnibus design in the construction of their vehicles. That fact was apparent at the company's inception in 1909 for the carrying out of experiments on a short length of line constructed at the Hendon depot of the Metropolitan Electric Tramways Company. Further evidence of the company's intention to improve upon the stereotyped form of public vehicle was afforded when the under-running railless trolley routes were opened in the outskirts of Leeds and Bradford. While the Leeds cars were provided with an entrance at the driver's end only, so that he could also act as conductor, the Bradford type of car was fitted with a conductor's platform at the rear, from which end passengers entered and left the car.

Since that time the chassis and the bodies of the numerous cars which the company have supplied to various installations in this and other countries have undergone improvements in one way and another, adding not only to the comfort of the passengers but facilitating the running of the vehicles. One notable departure is the double-deck type of car which is to be used in the main through thoroughfares of Brighton and Hove, while the latest is that of which illustrations are given on this and the following pages.



New Type of Railless Electric Car with Life-guard.

This vehicle constitutes the largest capacity railless trolley car yet constructed, and several of this type when put through trial runs fully justified the departure from standard type which had been decided upon to meet the special conditions of service for which they are intended. The photographs make fully noticeable the large capacity here obtained, a considerable area being provided for standing room, which is intended to deal with fluctuations in traffic up to a certain point.

Other important innovations are to be observed in the height of the floor and the number of entrances,

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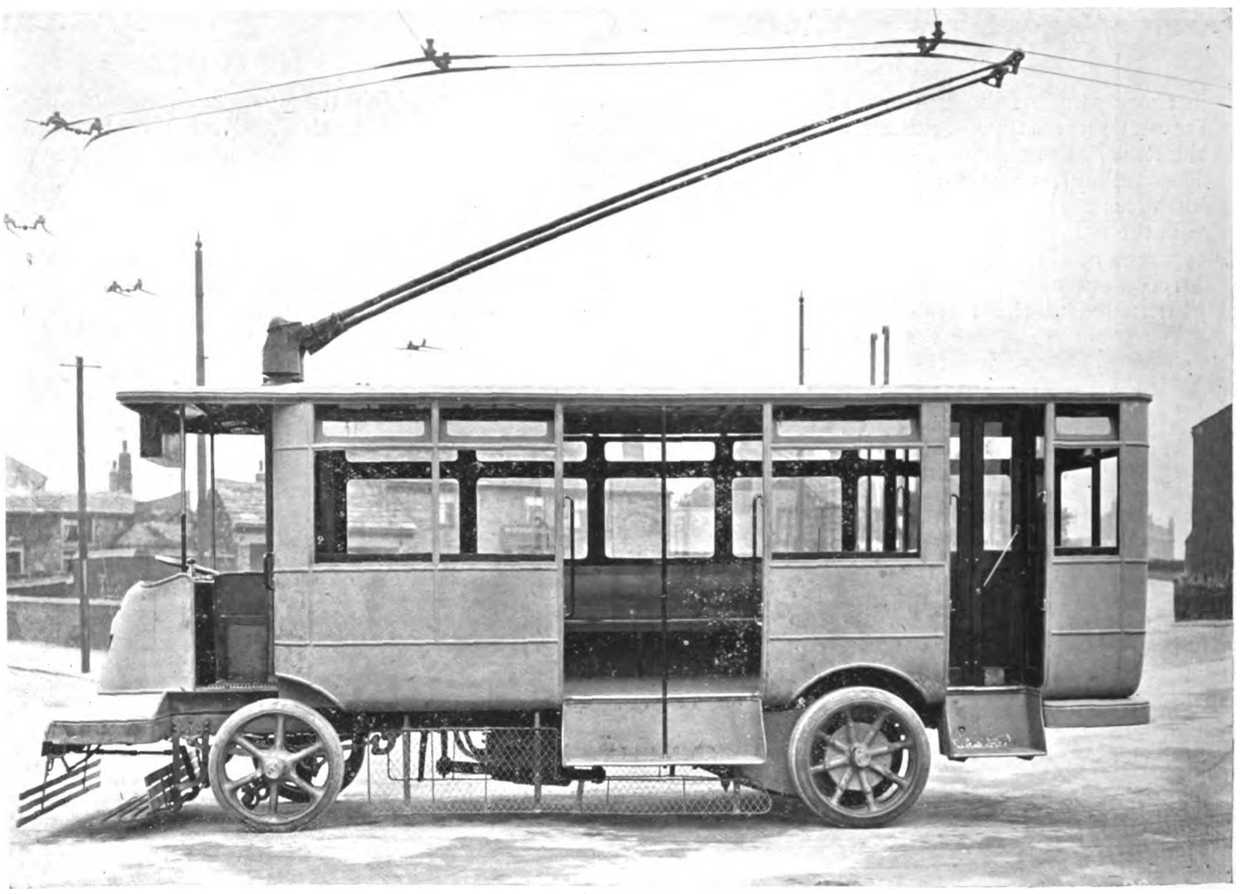
The floor of the car has been brought down as near to the roadway as is possible, and it will be seen that but one step is necessary to reach the deck. The car has two compartments, and the entrances are both at the side. The main or central entrance is of a considerable width, in order to permit of the rapid exchange of passengers at termini.

A life-guard constitutes the most notable of all the departures. It has been fitted in addition to the customary wheel-guards, and from the tests which were made with a dummy entirely satisfactory results were obtained.

The construction of this car embodies some fresh features, principally in connection with the body, which is of composite construction, and considering the greatly-increased size as compared with former vehicles, it forms a marked advance in weight reduction.

The general construction of the chassis follows upon the well-known R.E.T. design. The car is driven by two 28-H.P. motors, each coupled to a rear wheel. With regard to springing, a special form of spring has been employed, the dimensions of which have been very carefully selected after lengthy experiments, and the result achieved fully justifies the great trouble which has been taken to secure even and easy riding at all loads. The photographs were supplied by the contractors, the R.E.T. Construction Company, Limited, of London and Leeds.



New Type of Railless Electric Car Fitted with Life-guard.

New Tramway System for Vilna.—Approval has been given by the Council of Ministers to the raising of a loan of £427,000 for the installation of electric tramways in Vilna, Russia.

Doncaster Extension on a Grass Track.—An immediate start is to be made with the construction of an extension of the Corporation tramways to the new colliery districts of Woodlands and Warmsworth. The rails to Woodlands will be laid on the grass margin at the side of the road.

IMPROVEMENTS AT OXFORD CIRCUS STATION, LONDON UNDERGROUND RAILWAYS.

The Largest Escalator in the World.

The enterprise of the London Underground Railways and their policy of continuous improvement have been very much in evidence during the past six months, particularly in relation to the Bakerloo Railway, the oldest of the three lines comprising the London Electric Railways. In December last the extension of this line to Paddington was opened for traffic; in March its interchange facilities with the District Railway at the Embankment were greatly improved by the inauguration of moving stairways; and in the following month the new terminus of the Hampstead Railway at the same place and its connections thereat with the Bakerloo and District lines was completed. Another notable improvement recently carried out has been the installation of escalators, or moving stairways, at the Oxford Circus Station of the Bakerloo Railway, these being put into public service for the first time on Saturday, May 9. It is with this undertaking that we propose to deal; firstly, because the escalators in question are the largest in the world, and, secondly, because their construction has involved engineering difficulties of an arduous nature.

In America, the land of its origin, the escalator is utilised extensively, not only at railway stations, but also in the large stores and factories. In this country it was unknown, except in the primitive form of the endless link bolt, until introduced by the Underground Company, who, in 1911, installed the first moving stairways at Earl's Court to improve the connection with the surface station of the District Railway and the deep-level station of the Piccadilly Railway beneath.

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Since then escalators have been erected at several other stations on the underground system, and they are being installed also at the three deep-level stations of the extension of the Bakerloo Railway from Paddington to Queen's Park, which will be opened during the present year.

Work at Oxford Circus was commenced in November, 1912, the preliminary operations consisting in driving new tunnels, 11 ft. 8½ in. in diameter, from the south-bound platform to the lift passages, to take the place of those which would be blocked by the lower end of the escalator compartment. This task having been completed, preparations were made for boring the escalator tunnel. In the meantime 30 in. and 24 in. water mains beneath Oxford Street, and directly in the path of the escalators, had been diverted. The range of lavatories and other offices in the basement below the original booking hall on the corner of Argyle Street were removed, and the basement enlarged to form a new booking hall and circulating area and the machinery chamber of the escalators. Next, the columns supporting the station superstructure were taken out, and replaced by massive steel girders, the serious nature of these operations necessitating them being carried out piecemeal, extreme care having to be exercised in the shoring up and underpinning of the station buildings. The construction of the escalator tunnel then began, and the first ring of the lining was put into place on June 6, 1913. Water was encountered when boring operations had reached a depth of 33 ft. below the level of the street, and to overcome this difficulty a tunnel, 5 ft. 6 in. in diameter, was driven along the water line, completely encircling the path of the escalator tunnel, this work occupying eight days. The keys being withdrawn, interlocking steel piling was driven through the bottom of the tunnel into the clay. Thus only the water within the dam had to be dealt with, this being pumped therefrom into a pit in an adjacent part of the works, whence the water percolated through again to its own level, none actually being removed from the site. The 5 ft. 6 in. tunnel was then filled in with solid concrete, and the driving of the escalator tunnel resumed and completed without further obstacles being encountered. Connection with subways providing the means of access and exit to and from the platforms was then effected. The boring operations were carried out entirely by hand, and during the course of construction the engineers had to get the whole of their plant and tackle through an aperture in the roadway of Argyle Street only 5 ft. 6 in. square. The escalator tunnel has a diameter of 16 ft. 4 in., and a length of 110 ft. between the machinery chamber at the top and the lower landing compartment at the bottom, which is 21 ft. 2¼ in. in diameter.

Escalator at Oxford Circus Station—London Electric Railways.

The escalators consist of two stairways, one for descent and the other for ascent, and, like those at Earl's Court, they work alongside each other. Each stairway is formed of an endless chain, to which are attached 250 oak steps, 4 ft. in width, impregnated and fire-proofed. When the stairways are in motion 82 of the steps fall into position automatically on the inclined planes, which are 121 ft. long, with a vertical rise of 54 ft., practically double the size of the escalators connecting the Hampstead and District Railways at Charing Cross. Each stairway can accommodate 300 people at one time with ease, and, moving at a speed of 90 ft. per minute, the two combined are capable of transporting about 27,000 passengers in the course of an hour. The escalator which normally descends is reversible, this

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arrangement providing against the contingency of a stoppage to the ascending stairway, which in such case would be used as an ordinary stationary staircase by which passengers would descend, the reversible escalator being adapted for the ascent. Motive power is supplied by four 62-H.P., direct-current, shunt wound, interpole motors of the Otis type, of 560/600 volts, working at 473 revolutions per minute. Two of these are coupled together in the machinery chambers, which are situated beneath the upper landings of the escalators. One motor in each set operates a stairway, the other being a spare for emergency use, and in the event of an electrical breakdown to the working motor, the spare would be brought into service at once by a simple switching arrangement. The transmission is by means of spur gearing to the main driving sprocket at the top of the escalator, and also through a shaft and bevel gear to an auxiliary driving sprocket near the lower end of the stairway, the great length of the latter necessitating this supplementary drive. Should a failure of current occur an automatic braking attachment is at once brought into action, and a reversal of the ascending escalator prevented. Either stairway can be stopped instantaneously by the attendants stationed on the landings simply by pressing a switch. Passengers who prefer the lift as a medium of transit between the trains and the street—and there are now very few people with this peculiarity—will be able to use the lifts of the Central London Railway, which has subway connection with the Bakerloo line. The new circulating area and booking hall is reached from Oxford Street by a short flight of steps leading down to the entrance of the escalator compartment, and, adjoining, a new passage which connects the existing spiral staircase to the lower levels. Under the new arrangements the trains are reached from the street in about one and a half minutes, and even this trifling period may be reduced by passengers walking when on the escalators. The distance from the latter to the platforms is considerably shorter than the former one from the lifts, and altogether the new facilities mark a decided improvement upon the old means of communication. The total cost of the improvements and alterations will amount to over £53,000—a large expenditure, but one reflecting not only the wonderful development of traffic at Oxford Circus which rendered it necessary, but also the progressive policy of the Underground Company in effecting these and similar improvements as occasions arise.

NEW SHOPS OF WOLVERHAMPTON CORPORATION TRAMWAYS.

The depot of the Wolverhampton Corporation tramways in Cleveland Road has recently been enlarged by the construction of a new workshop, which has been fully equipped with machine tools worked by electric motors. The size of the new building, which is shown in the accompanying illustrations, is 173 ft. by 60 ft., and it includes an electrical shop, paint shop, carpenters' shop, and a general machine shop, together with stores, mess room, rolling stock, superintendent's offices, etc. At the side of the depot provision is also made for a sand ground, scrap bins, and the storage of petrol and carbide. The steel storage bins have been fitted and supplied by Messrs. Estler Brothers. The main entrance and also the entrance to the paint shop are fitted with revolving steel shutters. Granolithic paving has been used for the floors of the workshop, while the stores, offices, and mess room have been laid with pitch pine blocks. The stores are ranged down one side of the building and are separated from the shop by tubular screens. As shown in one of the illustrations, two inspection pits are provided in the general repair shop, and an electric travelling crane with steel stanchions and girders runs down the centre of the machine shop.

Façade of Depot and Workshop—Wolverhampton Corporation Tramways.

Electrical energy for lighting and power is supplied

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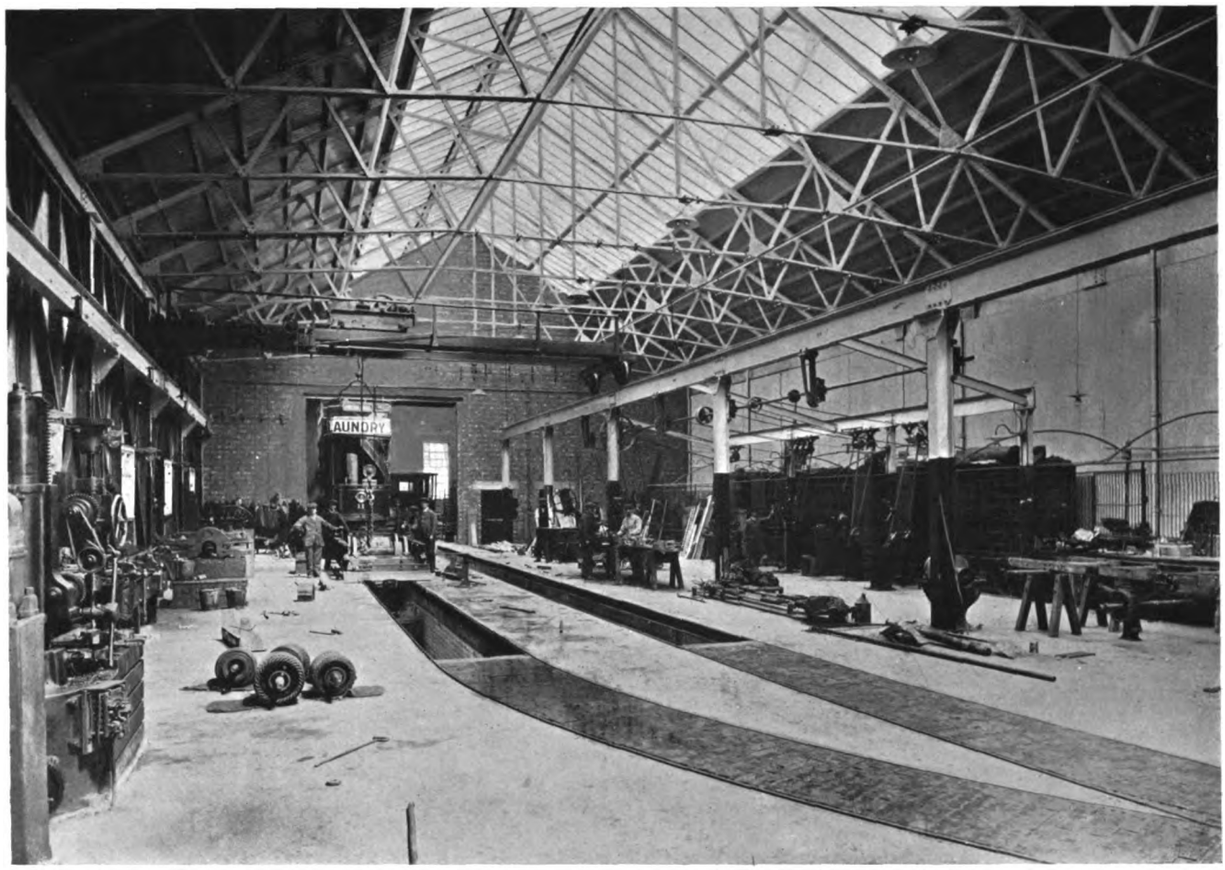

Machine Shop—Wolverhampton Corporation Tramways.

General Repair Shop—Wolverhampton Corporation Tramways.

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through a three-wire installation. A 500-volt service feeds the track connections, travelling crane and testing bench. All line shafting and counter shafting are fitted with ball bearings. The electric motors were supplied by the Electric Construction Company, Messrs. Verity's, and Thomas Parker, Limited. The electrical installation and equipment of the shops have been carried out to the specification of the tramways engineer, Mr. C. Owen Silvers. The buildings were designed by the borough engineer, Mr. George Green, and the work was carried out by Messrs. Gough and Company under the supervision of Mr. H. B. Robinson, chief assistant of the borough engineer's department.

The Wolverhampton Corporation tramways, of which Mr. W. A. Luntley is general manager, are the only lines now worked in this country on the surface-contact system. They were originally laid down in 1902 on the Lorain surface-contact system and there are now about twenty-one miles of track. Since the opening, the lines have been worked very efficiently, and a substantial reserve fund has been built up, a considerable contribution being made to the rates each year.

An interesting point in the maintenance of the permanent way is the employment of an oxy-acetylene welding plant and electric grinder, which have been successfully used in the renovation of hammered joints. These joints are first ground on the worn surface, then a piece of special steel, made to the tramway engineer's specification is welded on, and after the patch has cooled the metal is refined by re-heating to the resolescent temperature and vigorously peened. After the second cooling the patch is ground off level with the rail surface. During the last two and a half years nearly 1,000 joints have been treated in this way.

B.E.A.M.A. AND THE I.E.E. MODEL GENERAL CONDITIONS OF CONTRACT.

The text of the model general conditions of contract, issued by the Institute of Electrical Engineers, was formally adopted by the Council of the British Electrical and Allied Manufacturers' Association at a meeting on May 21, and as a consequence will be used by members (in substitution of the Association's conditions) in respect of tenders to municipalities, district councils, public authorities, and of all publicly-advertised contracts where full general conditions are issued.

GERMAN RAILWAY STATIONS AS TRAMWAY CENTRES.

The provision of tramway tracks in what may be described as the forecourt of the fine new railway station at Leipzic is a capital illustration of the care and thought which is given in Germany to the planning of public works. The station was opened in the course of last year, and is probably the largest and certainly one of the finest stations in Europe, and it has cost about six millions sterling. A noteworthy feature is the great space in the front of the building and the width of converging thoroughfares. It is so situated that the tramway services provide convenient access to it from all parts of the city. The building has been under construction for about 10 years; it forms the central point of the Prussian and Saxon railway lines, and consists of a central block with two wings. The central block, which is divided into a Prussian and Saxon half, is 984 ft., while the two wings are each 295 ft. long, giving a total length to the front of 1,574 ft. The internal arrangements are simple and convenient, enabling the intending traveller to find his way about quickly and without difficulty. The concourse of the main station has a high arched roof, much of which is glass, with a length of about 900 ft., and a breadth of 66 ft.; it is divided into six parts. Twelve island and two side platforms abut at right angles to the concourse. Under the roof of the main station there will be 28 lines of way. The work is still incomplete, but the whole of the new structure will shortly be available.

Tramway Connection with the New Railway Station at Leipzic.

At Frankfort, as at Leipzic, very convenient access to the central station is provided from all parts of the city by tramways. The tracks are laid in all important thoroughfares. Small single-deck cars are used throughout the city, and a good average speed is maintained. There is no prejudice against the tramway cars on the part of the city authorities, who recognise that there is no safer or more convenient method of providing transportation than by well-conducted electric tramways. All the routes are numbered, and the numbers are clearly shown on the cars. The great majority of persons using the railway station come by tramway from all parts of the city, and as the cars pass close to the doors, the crowds are dealt with conveniently and expeditiously.

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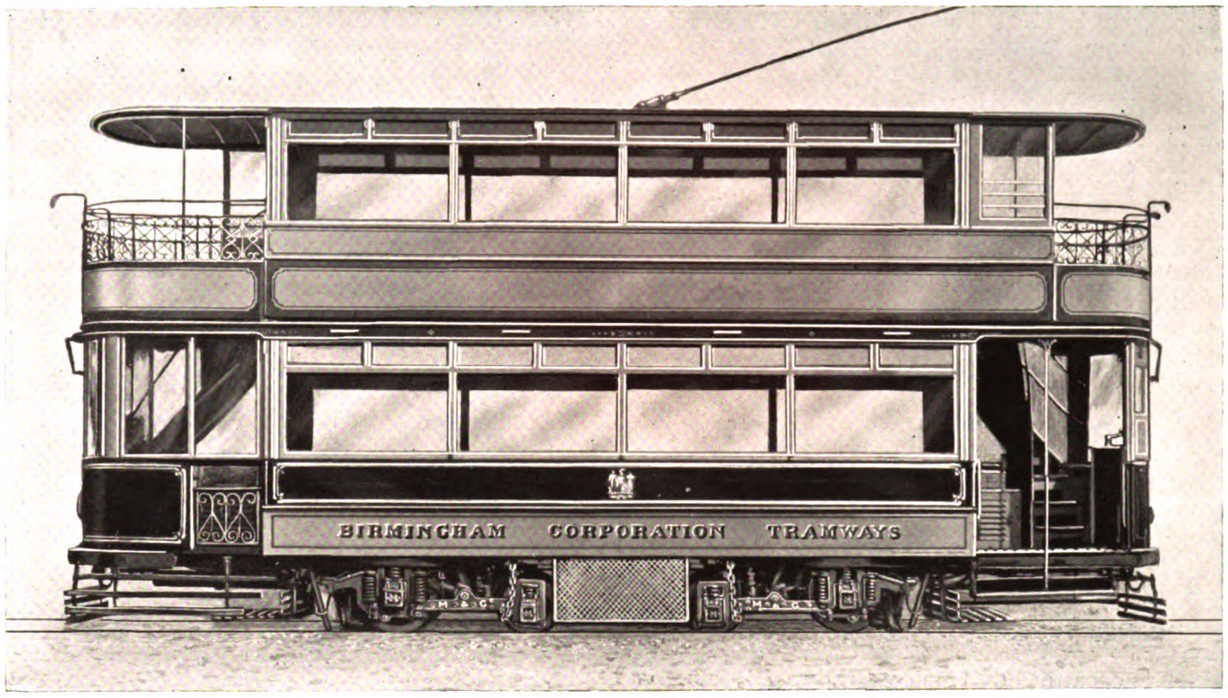
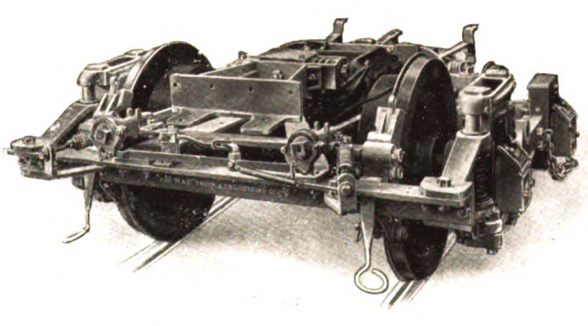
M. & G. TRUCKS FOR BIRMINGHAM.

Some months ago the Birmingham Corporation ordered bogie trucks for 75 cars from the M. & G. Truck and Engineering Company, London, and over 60 sets are now in service. The company can point to a fine record in tramway trucks for heavy service, as their predecessors were Mountain and Gibson, Limited, who built the No. 3 L maximum traction trucks which were supplied several years ago to the London County Council, and were adopted by them as standard. While the Birmingham cars are not quite so heavy as those in London, they have to contend with many severe gradients and sharp curves, as well as the disadvantages of a 3 ft. 6 in. gauge.

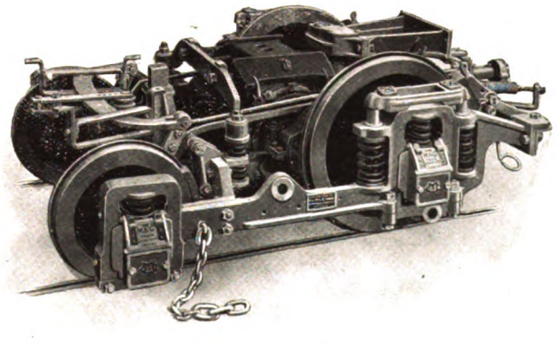


Birmingham Corporation Car on M. & G. Trucks.

In this Birmingham truck the weight of the car is taken on side bearers situated over each driving wheel horn. Anti-friction metal rubbing blocks are recessed into the side bearer castings, and these blocks engage with curved angle plates attached to the car under frame. It is claimed that a greater amount of weight is available for adhesion than with any other type of single-motor bogie. An adjusting device fixed to the centre sill of the truck prevents any tendency to derailment of the pony wheels. The centre pin of each bogie, which is supported by a heavy bracket secured to the end sill of the bogie, is situated immediately over the driving wheel axle on the longitudinal centre line of the truck. The centre pin engages with a draught bracket attached to the cross bearers of the car body. The bracket is fitted with a sliding die, in which the centre pin engages, and a spring attached to the die absorbs any lateral shocks. The brake gear, which embodies the Birmingham Corporation standard brake shoes and holders, operates on all four wheels. The tramway engineer is responsible for the ingenious equalising device by which the proper proportion of brake pressure on the driving wheels and pony wheels is effected. All wheels have steel tires, and the driving wheels have pressed mild steel centres. The Dick-Kerr motors employed are arranged for double driving by an arrangement patented by Messrs. Baker and Dickinson. The gear wheels are secured to the driving wheels by steel studs. These studs are relieved of the driving stresses by the fact that lugs on the face of the gear wheel engage with recesses on the driving wheel centre.



End View of M. & G. Bogie Truck.



Side View of M. & G. Bogie Truck.

The axle boxes are machined to close limits on the outside, so as to be a sliding fit in the side-frame jaws. This follows the best locomotive practice. The M. and G. standard type of spring lid which is applied to the

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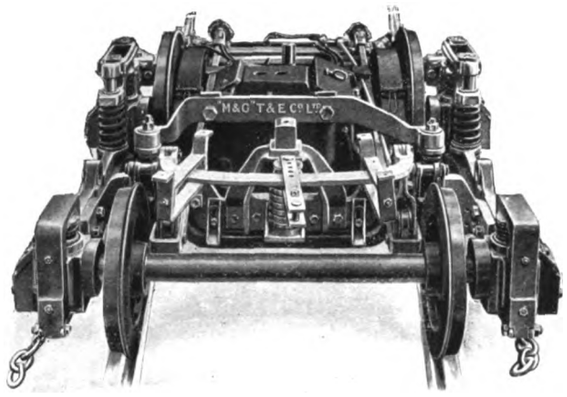
axle boxes affords easy access for oiling or examination. Renewable cast-iron wearing plates of large area, machined all over, are fitted to the side frame horns.

In the design and manufacture of these trucks it has been found possible, substantial as they are, to keep the weight within reasonable limits, and accuracy of machining and erection as well as interchangeability of parts have been secured. The experience already gained with the M. and G. trucks in Birmingham has



M. & G. Bogie Truck with Motors in Position.

shown that they provide comfortable riding, minimise current consumption, and can be maintained at low cost.

"SAFETY FIRST."

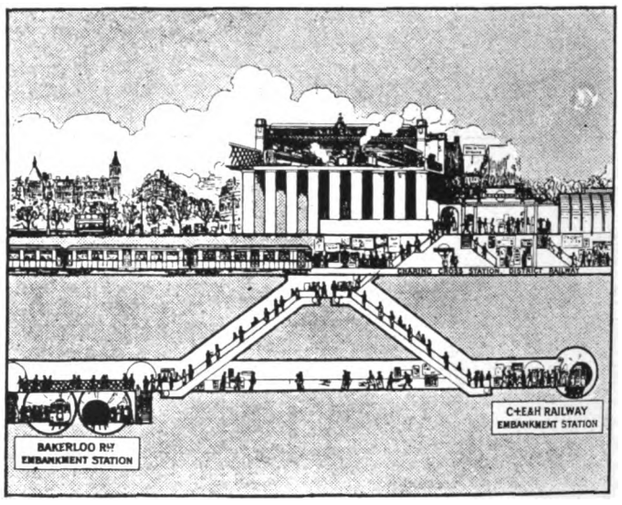
A "Safety First" movement has been instituted at Glasgow by Mr. J. Dalrymple, general manager of the tramways department. He has issued to the car crews and to the public a list of suggestions for the avoidance of accidents. Special attention is also to be paid to the needs of school children in that respect. The "Safety First" movement, which had its origin in the United States with a view to lessening the number of accidents among railway employees, has spread to the tramway companies. In Canada, Mr. A. Gaboury, the superintendent of the Montreal Tramways Company, is the first to take it up. In the pages of a little folder, accompanied by a brief letter addressed to "Dear Friend," he has set forth before the employees the precautions to be taken to ensure safe working. This has been followed up by the issue of a letter to the owners and drivers of every vehicle in the city, together with a list of "Dont's," and already several hundred of them have promised co-operation.

Mr. Gaboury recently visited several of the American cities where the street railway companies are carrying on "Safety First" campaigns, notably Philadelphia, Newark, and Brooklyn. The main difference between the campaign which is being carried on by these cities and that of Montreal, is that these cities are beginning with an appeal to the school children. A Bureau of Safety has been established in Brooklyn, and in this city Mr. Gaboury witnessed a cinema picture drama, entitled "The Price of Thoughtlessness," dealing with "Safety First" subjects. The film will be brought to Montreal. Mr. Gaboury has had all the car-stop signs marked with a white band several feet deep with "Safety First" in bold lettering.

In England the "Safety First" propaganda has been vigorously taken up by the Great Western Railway Company during the past nine months, through the medium of illustrated articles in their magazine. The directors of the company place so high a value on the work that they have decided to reprint the articles in pamphlet form. The articles are also being reproduced in the magazine published by the railway and tramway department of one of the Australian States.

FIVE CHARING CROSS STATIONS.

The accompanying illustration depicts the five stations which are now to be found, above and below ground, at Charing Cross, full particulars of which were given, with several illustrations, in our issue of THE TRAMWAY AND RAILWAY WORLD of December 11, 1913. At the highest position in the present drawing the sectional view shows the south side of Charing Cross station of the South Eastern and Chatham Railway at a point north of the bridge carrying the railway over the Thames. Under the forecourt of this station is the Charing Cross station of the electric railway to Euston and Hampstead, one of the entrances being situated near the position in which the title of the Underground Railway is placed on the right hand side of the illustration. Below the south end of the South Eastern terminus is the Charing Cross station of the District Railway, which is connected by escalators with the Embankment station of the Bakerloo Electric Railway from Baker Street to the Elephant and Castle, and with the new Embankment station of the Charing Cross, Euston, and Hampstead Railway. The latter is a new station, and it is also connected by a passenger subway with the Bakerloo Embankment station. The



Sectional Diagram of the Five Charing Cross Stations.

extension of the Hampstead line by 200 yards from Charing Cross was begun in October, 1911, and it was opened for traffic a few weeks ago. In addition to giving communication with the Victoria Embankment, along which run the London County Council tramways, the new line has been taken partly under the river in the shape of a balloon-shaped loop. Around this loop trains are sent, thus obviating reversing and crossing over at a dead-end terminus. The loop is single-track, 880 yards in length, and it reaches 65 yards beyond the Thames Embankment wall. There are only from 18 in. to 3 ft. of clay above the top of the tunnel, and above that is the water-bearing ballast forming the river bed.

The Montreal Tramways Company are appealing to the Privy Council against a decision of the Appeals Court holding that the Quebec Public Utilities Commission have power to order the company to furnish details of equipment, running schedules, service, and their relations with the city.

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VESTIBULED TOP-COVERED CARS FOR NOTTINGHAM.

In view of the growing popularity of vestibule cars, the new cars of the vestibule type supplied by the United Electric Car Company, Preston, to the Nottingham Corporation Tramways will no doubt be inspected by tramway committees and managers with much interest. In these cars the vestibules are built up complete from the platform bearers, and the lower half of the centre light is fixed, while the upper half is arranged to pivot by means of a brass quadrant, and to be fixed in any position up to an angle of 45 deg. The lower portion of the upper light and the top frame of the lower light are provided with brass meeting rails. The vestibule fronts are in three sections, so that in case of injury in a collision it is only necessary to replace the section damaged. The side windows are divided into two parts, on the Preston semi-convertible principle; the upper part is arranged to slide down, thus practically converting the car into an open car during hot weather. These lights are fitted with the Preston improved lift (registered design), which is a considerable improvement. The principal dimensions of the car are: Length over corner pillars, 17 ft. 6 in.; length over collision fenders, 29 ft.; width over pillars, 6 ft. 9 in.; width over lower roof, 7 ft.; height inside lower saloon, 6 ft. 4¾ in.; height inside upper saloon, 5 ft. 11¾ in. The weight of the car empty, but including electric equipment, is about 11 tons. The seating capacity is 24 in the lower saloon and 40 on the upper deck. The electrical equipments are by Dick, Kerr and Company.

The upper half of each of the end lights is coloured to prevent the reflection of the light at night on the vestibule lights. The side lights are fitted with blinds of the Preston type made up in "leatheroid." The side lights of the upper saloon can be raised or lowered simultaneously by rack and pinion gear. The destination boxes are of the Preston Company's make, and the car body is mounted on their improved flexible-axle truck, which has been described in these pages and has been supplied to a large number of towns at home and abroad, with very satisfactory results. Trucks of this type have recently been delivered to West Hartlepool, Preston, and Aberdeen Suburban Tramways, and orders are in hand for Oldham (repeat), etc.

Latest Type of Car for Nottingham Corporation Tramways.

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THE
Tramway and Railway World

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LONDON, JUNE 11, 1914.

Railless Cars, Omnibuses, and Road Maintenance.

Several decisions have been given by Parliamentary Committees during the last few weeks to the effect that railless trolley vehicles and motor omnibuses must contribute to the cost of maintenance of the roads that they use. During last year the principle was to a considerable extent established with regard to railless trolley cars, and only very tentatively with respect to motor omnibuses, but now it promises to be regularly applied whenever possible in the case of omnibuses also. Naturally the question was first raised in connection with railless cars, because neither a local authority nor a company can put up the poles and overhead wiring for running these vehicles without first getting Parliamentary sanction. But any individual or any limited liability company formed for the purpose can run omnibuses wherever he or they choose, subject only to getting the ordinary licence for each vehicle. Hence it was only when local authorities wished to run omnibuses that the question could be raised before Parliamentary Committees. Even then it only emerges if the vehicles are to be run outside the boundaries of the traction authorities. A fortnight ago we referred to the exceptional case in which the Middlesex County Council have been granted authority to charge three-eighths of a penny per mile run by omnibuses over the new London western approach road which they are going to construct. That proposal is likely to be strongly resisted at subsequent stages of the bill, but in view of other events it seems probable that the opposition will not be successful. The records of the Parliamentary Committees for the past two or three weeks show the trend of opinion. Wallasey Corporation are ordered to pay three-eighths of a penny for every mile which their railless trolley cars run over county roads. Manchester Corporation will have to obtain consent, on terms, from the outside local authorities before running motor omnibuses on roads outside the city. Leeds Corporation must pay the three-eighths of a penny for each mile run by their railless trolley vehicles outside the city. Birkenhead Corporation have to submit to a clause providing that the consent of Cheshire County Council shall be necessary before the Corporation's omnibuses can be run in the outside districts (which consent shall not be unreasonably withheld), and that failing agreement an arbitrator shall decide the amount of contribution towards the maintenance of county roads used by the omnibuses. All this is fair and reasonable; but it is unfortunate that a code of law should have to grow up in this haphazard fashion, instead of being initiated by Government and formulated by public legislation. If that had been done, Parliamentary Committees would have had a guide. The absence of such general legislation is productive of great unfairness, which will go on increasing until it becomes intolerable. The local authority or the company working the railless trolley system have to pay for road maintenance. So have the local authority who run omnibuses. But practically anyone except a local authority can now run omnibuses without paying a penny for road maintenance. The metropolitan area is not the only one in the country where local authorities are being involved in greatly increased expenditure, not merely for maintenance, but for fundamental reconstruction of roads cut up by omnibuses and heavy motor traffic which pay nothing. General legislation would also cover the case of the motor lorry and the heavy goods van, which in proportion to their numbers (always increasing, by the way) probably do more damage to the roads than the omnibuses do. The Government, through the mouthpiece of the Home Secretary, say they are

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"considering" the matter. There has been more than enough time for consideration; what is wanted is action.

Difficulties of Private Bill Procedure.

At one of the early meetings of the Royal Commission on Railways the Speaker's counsel advocated considerable reform in private bill legislation. This has long been urgently needed as respects tramway enterprise, and the time would seem to be opportune for the Municipal Tramways Association and the Tramways and Light Railways Association to turn their attention to the matter. Encouragement for so doing is to be found in the success that attended their representations to the Board of Trade for the amendment of the Light Railways Act in 1912, and another reason is afforded by the inquiry now being made by the Board of Trade into the existing means of transit in typical cities, with a view to legislation being tabled by the Government to ensure cheap transit to facilitate the carrying out of town planning schemes. As further inducements to the two Associations to take action, the incongruities that have marked the consideration of tramway bills this session by Committees of the two Houses of Parliament may be cited. In connection with the unopposed bill of the Norwich Tramways Company surprise has been locally expressed at the great expense to which the company have been put, and it is astonishing also to find that the Speaker's counsel informed the Committee there were no precedents for the clause asking for powers to deal with obstructions on the tramway lines. The company's Parliamentary agent, however, produced several precedents, and the Committee accepted the clause. On May 8 a Committee of the House of Commons inserted in the Middlesex County Council's bill for the construction of a new road from Chiswick to the Bath Road, a clause for the payment of three-eighths of a penny per omnibus-mile by owners who may use the road. Yet, Lord Barnard, the chairman of the House of Lords' Committee, who, on May 18 onwards, considered the Birkenhead Corporation's bill for powers to run motor omnibuses outside of the borough, expressed regret that the question of imposing a similar rate of payment should be left to the Committee, because they might be creating a precedent which would cover many cases hereafter. The Committee, he added, had no precedent as to whether this was fair, just, and equitable. Every Committee ought to be aware that a charge of three-eighths of a penny has been levied upon railless trolley vehicles, which are generally admitted to be less damaging to road surfaces than motor omnibuses. Then, again, at a sitting of the House of Lords' Committee, who are considering the Glasgow Corporation Tramways Bill, when counsel was discussing a witness's statement as to what had been done in Berlin in regard to the effect of tramway traffic on laboratory work, Lord Ribblesdale, the chairman, said that counsel must try and arrange something between them as the Committee did not understand Berlin, and had never been there. The Glasgow bill also affords a glaring instance of the inconvenience to which supporters and opponents of a measure are put by the proceedings having to be adjourned in consequence of the inability of one or more of the members of a Committee to continue in attendance. When the proceedings had lasted two days a member of this Committee was stated to be unable to attend on May 19 and 20. Although counsel for some of the interests opposed the suggested adjournment, the further hearing was adjourned to June 9. The President of the Local Government Board, in a speech at Sheffield, referred to the transit inquiry which the Board of Trade are conducting, stating that its object was to enable the Government to make proposals for meeting needs where they existed, involving, he said, no doubt the enlarging and simplifying of the powers of local authorities to supply tramways and other means of locomotion. In view of the fact that all tramway proposals put forward by local authorities are sanctioned by town's meetings, and often by a poll of the ratepayers, the wisest course would be to bring tramway schemes under the purview of the Light Railway Commissioners, whose proceedings are conducted locally.

Tramways and Laboratories.

One of the tramway lines proposed by the Glasgow Corporation bill, which recently came before a Committee of the House of Lords, was rejected on unusual grounds. The proposed line was to be about half a mile long in University Avenue,

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so as to form a connecting link which would relieve pressure on other routes. Unfortunately the buildings of Glasgow University abut on the avenue, and the University authorities were up in arms against the proposal, on the ground that research and experimental work in their laboratories would either be made impossible or would be much prejudiced. Damage it was maintained would be caused in two ways—first by electric and magnetic disturbances, and secondly by mechanical vibration caused by the cars. In regard to the former, it appears that much has been done to prevent mischief of the kind in Berlin by the use of two trolley wires, thus providing an insulated return. In London, Greenwich Observatory instruments have been protected by the use of insulated returns on all the tramways in the neighbourhood. But the *cause célèbre* was, of course, that of the London United Tramways and the Kew Observatory. When a line near the Observatory was authorised some years ago, the company had an obligation put on them to use an insulated return. A year later that obligation was removed, but a proviso was left giving the Board of Trade power to prescribe such precautions as they might deem advisable. Finally the tramway company got over the difficulty by agreeing to pay the Observatory £10,000 and the latter removed their more delicate instruments to Eskdalemuir, a lonely region in the south of Scotland. In the present case the Glasgow Corporation offered to use an insulated return and not to run cars at night. Still the opponents were not satisfied, and made much of possible disturbance of instruments from the magnetic fields of the motors of passing cars. Then as regards vibration, it was very difficult for the promoters to show how the vibration caused by the cars would not disturb microscopic and other delicate work in the laboratories which are so close to the street. The University authorities made a very strong case, and they succeeded in their opposition. It must be remembered that no tramways are anything like so near to Greenwich Observatory or Kew Observatory as this proposed tramway would be to Glasgow University. If, therefore, the Corporation bring forward the scheme again, they will be well advised to come to some arrangement with the University authorities.

OBSTRUCTION OF TRAMWAY TRACKS.

Extraordinary Attitude of London Police.

Some time ago the London County Council had to complain of the action of the Metropolitan Police in connection with obstruction on the tramway tracks. It was found that when the tracks became blocked by reason of a collision between vehicles other than tramcars or from other serious cause, the police would not allow the disabled vehicles to be removed to the side of the street until a special officer had come from Scotland Yard and examined the wreck *in situ*. In this way tramway traffic on a busy route might be blocked for an hour or two, while the mere work of moving the obstruction to the side of the street would only take a few minutes. The County Council protested against the waste of time, the inconvenience to the public, and the loss of tramway revenue which were entailed. No satisfactory concession was obtained from the Home Secretary, but less has been heard of the trouble since. During the past month, however, a very flagrant case has occurred in West Ham, which although outside of the county of London is within the Metropolitan Police area.

On May 5 the tramway traffic on both tracks in Woodgrange Road, Forest Gate, West Ham, was obstructed for nearly two hours, and that at a time when there is plenty of business to be done, namely from 7-12 to 9-0 p.m. The cause was a collision between a motor omnibus and a private motor car. The local police sergeants and constables at once took charge and refused to allow the West Ham Corporation tramway officials to touch the disabled vehicles until the "police expert" should arrive. When that gentleman did reach the scene of the accident he did not, according to the testimony of the tramway inspectors, make any examination of the wreck but merely ordered its removal to the side of the road. The tramway service during the two hours was maintained in a sort of a way by turning cars back in both directions. The passengers who had to change cars were obliged to push their way through the crowd which assembled for the intellectual enjoyment of looking at a disabled omnibus and motor car.

Here then is a substantial case of needless and inexcusable traffic delay. Now for the unavailing attempts to find a remedy against the recurrence of such incidents. On May 7 Mr. J. S. D. Moffet, the tramway manager, wrote to the Commissioner of Metropolitan Police setting out the facts. The letter concluded:

"On protesting to the police sergeants, our inspectors were informed that this unwarrantable and stupid—to put it mildly—obstruction of the general traffic, which caused immeasurable inconvenience to the general public, was the result of orders received from Scotland Yard. As I cannot believe that such a scandalous state of things would be tolerated by you for one moment, I shall be glad to know whether you could arrange for an interview between myself and your Superintendent Bassom to go further into the matter."

On May 8 a formal acknowledgment, being a printed form with the date written in, was sent in reply. This form states in the usual way that the matter will receive the Commissioner's careful attention.

The matter was mentioned at a meeting of West Ham Town Council on May 12, when Alderman Littler, chairman of the Tramways Committee, said he could not imagine anything more idiotic. In the past such obstructions had been removed by the tramway

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staff without any damage. The police deliberately obstructed the King's highway for two hours for no practical purpose whatever.

Alderman W. Thorne, who besides being a member of the Corporation, represents the southern division of West Ham in Parliament, put a question on the subject to the Home Secretary in the House of Commons on May 19. In his query he narrated the main facts, and asked what was the ground for instructing the police that in such cases nothing must be done until a Scotland Yard official reached the spot. Mr. McKenna, in his reply, said he was informed by the Commissioner of Police that the facts were generally as stated. Seven persons were injured. When a collision in which a motor public carriage was concerned resulted in death or personal injury, it was necessary in the interests of justice that the cause of the accident should be ascertained, and for this purpose an examination of the vehicle *in situ* by a competent official was essential. Such examination was only made in cases of serious accident. He would inquire why there was so much delay in this case. Not much satisfaction from the point of view of tramway authorities was to be got out of this answer.

The action of the police authorities in cases of this kind looks like a part of their policy to hamper and restrict tramways in every way possible. No one will deny that in the case of an exceptional accident, where people may be killed as the result of a collision, it may be advisable to have the wreck examined by experts before it is moved. But in the ordinary case, which is in the vast majority, there is no such need, and indeed in the present instance it was plain that the holding up of traffic for two hours was quite superfluous, because when the expert came he did not think it necessary to take even a second glance at the wreck. Moreover, even if it were necessary to have such inspections, arrangements should be made whereby officers more or less experienced should be stationed in every locality within the Metropolitan Police district, so that one of them might be on the scene of a collision within a few minutes after its occurrence. These officers could have other local duties to perform, so that they would not be idling about and waiting for collisions to happen. In an area of such size as the Metropolitan Police district, it is absurd that it should be necessary to call an expert from Scotland Yard, which, as in the West Ham case, is miles distant. Even more extreme cases as to distance could be found in connection with tramway systems in the neighbourhood of London which are within the Metropolitan Police area.

But the tramway manager in other parts of the country may well ask why there should be any such police regulation at all. So far as we have heard no such rule exists in an other city or town in the United Kingdom. Yet presumably street collisions are inquired into and justice done. The practice of tramway authorities when the tracks become obstructed owing to a collision or to the breakdown of vehicles, is to get their men on the spot at once and to clear off the obstruction to the side of the road. Many of the authorities pride themselves on the celerity with which such work is done, so that there may be the minimum interference with the tramway traffic. Tramway managers will readily appreciate Mr. Moffet's indignation when he found himself for the first time face to face with the autocratic and unreasonable action of the Metropolitan Police. It is not so long since he left Rochdale, where no doubt matters are managed in a very different and a better way. But tramway managers in the metropolitan area have many things to contend against from which their brethren in the so-called provinces are free.

CORRESPONDENCE.

The Use of Meters on Tramcars.

To the Editor of The Tramway and Railway World.

Sir,—It seems rather late in the day to start a discussion as to which is the best type of meter for use on tramcars, as this question has to a large extent, and in England almost entirely, settled itself some years ago, but the letter in your issue of May 7 from Mr. Montijn should hardly be left to stand without an answer, so with your permission I should like to reply to it as briefly as possible. I had some difficulty in not replying before to Mons. Delthil's statement as to the origin of the mercury motor meter, and will take this opportunity of doing so. Messrs. Chamberlain and Hookham, Limited, were without question the first people to produce such a meter, the other types now on the market having been put forward after the expiration of Messrs. Chamberlain and Hookham's original patents.

To return to Mr. Montijn's letter, this gentleman does not seem to be aware that in spite of all the methods he speaks of having been tried to make time meters a success, they have gradually disappeared off most of the systems on which they were installed. I therefore do not propose to follow any further in his advocacy of these instruments. Again, as regards watt-hour versus ampere-hour meters, Mons. Delthil has already dealt pretty fully with the disadvantages of the former, and I therefore do not propose going over all this ground again.

The one point that appears to me to stand out in Mr. Montijn's letter is that each one of his meters has had to be taken off the car over five times a year at a total cost of approximately £1 per meter per annum. Compare this with the fact that we maintain our tramcar meters in England under contract for 3s. 3d. per meter per annum for 20 years, and I think further remarks from me are unnecessary.

Yours faithfully
(for Venner and Company),
Ernest E. Sharp, *Manager.*

May 15, 1914.

THE SPENCER-DAWSON BRAKE.

Since the publication of the article in our issue of May 7, describing the successful trial of the Spencer-Dawson tramcar brake at Bradford, the writer of the article has received from Mr. Dawson figures of some trials in which an oil was used of considerably lower viscosity than that employed in the brake which was tested. The figures show higher average retardations, and correspondingly lower stopping times and distances. The lower viscosity of the oil has a similar effect to the suggested enlargement of valve ports and tubes in obtaining a higher retardation at the beginning of the stop, when it is most effective; and there seems no good reason why any desired rapidity of action—at least up to the limit imposed by the safety of passengers who may be standing or walking—should not be attained by a suitable selection of fluid and of brake blocks.

The Demand for Subways.—Discussing the demand for subway systems on the part of many large cities in America, the *Electric Railway Journal* says: "Subway service is a luxury which only the very largest cities can afford, and even in New York the last subway contracts are being subsidised by the city, which practically guarantees the railway companies against loss from their operation."

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THE APPLICATION OF BALL BEARINGS TO TRAMCARS.

(From a Correspondent.)

Efficiency and reliability are of first importance to all public service vehicles. To obtain a high efficiency it is necessary to have good bearings suitable for heavy loads at high speeds, and at the same time they should be fool-proof, and should occupy the minimum amount of room. These requirements make the use of ball bearings desirable, and such bearings are now applied to the road wheel axles of some tramcars.

The efficiency of a good ball bearing can be taken at 98·75 per cent.,

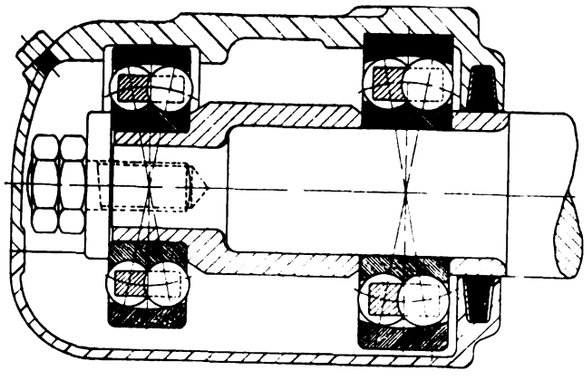

Fig. 1.

while the coefficient of friction is 0·0012 considered to the shaft diameter. A usual method for finding the saving in power is by means of a spring balance. The pull which is required to keep a car moving when mounted on plain bearings is noted, and that required when the same car is mounted on ball bearings. The pull required when mounted on ball bearings is only 50 to 65 per cent. of that required when mounted on plain bearings Besides the saving in power when running, the ease of starting and acceleration permits of a journey being accomplished in a shorter time.

Ball bearings are practically free from wear, and when the correct size and type are decided upon the steel is not over stressed, with the result that the bearings have a long life. The opposite holds true when the bearings chosen are not of ample size. The cost of the attention which plain bearings require to prevent trouble from heating and wear is saved. The design of ball bearings has developed from the early

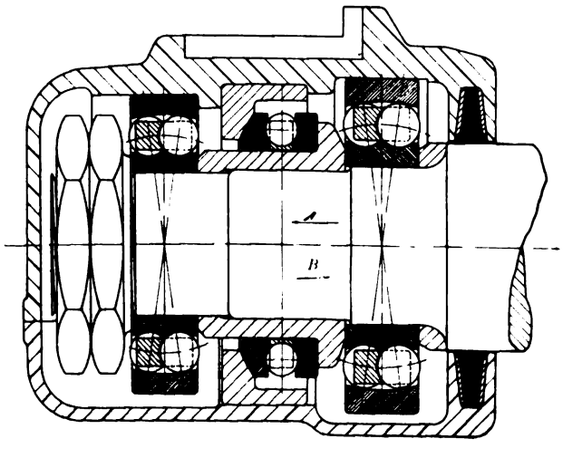

Fig. 2.

crude types, which were badly made, to the present-day bearings, which are manufactured from the best alloy steel, hardened right through, and ground by specially-designed machinery to within one-ten-thousandth part of an inch. Fig. 1 shows the method of mounting when existing axles are used. The axles are first turned to suit the bearings and sleeve, and only one of the radial bearings in each axle box is confined laterally, so that all side thrust resulting from the turning of corners is taken by one bearing. With the design shown, this is not harmful; no jamming or wedging takes place (Fig. 3). This type also allows the axle box to align itself so that the correct load upon its bearings is obtained.

Fig. 2 shows the case where a single thrust bearing is used to take the very severe thrust loads resulting from the passage over very sharp curves. The direction is shown by the arrow (*A*). There is also a small thrust in the opposite direction as shown by the arrow (*B*). This is taken by the radial bearing and keeps the races of the thrust bearing together, and so prevents trouble The inner race of radial ball bearings should be a light driving fit upon the shaft. The latter should be truly round, and of good finish, and must also be securely clamped against a shoulder by means of a nut of ample proportions. The bore of the axle box must be truly round, and as nearly as possible of the same diameter as the outer race of the bearing, so that it is supported round the circumference. This is essential to obtain the maximum number of balls taking the load.

It is possible to have what is termed a permanent load put upon the balls through having the inner race of the bearing a very heavy driving fit upon the shaft. This compresses the balls, putting a load on them which is not useful load. It should be guarded against by careful fitting, a very light driving fit only being necessary, and it is obtained when the shaft is made 0·0015 in. greater in diameter than the bore of the bearing. The shaft generally machines up suitable for a bore of a bearing of 85 to 90 mm. The diameter of the balls in a bearing should not vary more than $\frac{1}{10}$ of one-ten-thousandth part of an inch. No difficulties are now experienced in manufacturing to this limit, owing to the very efficient measurement instruments which are now in daily use. Should one ball be greater in diameter than the rest, it becomes overloaded, and consequently fails.

There is no such thing as a cheap good bearing. The material must be the very best possible. The ore should be obtained from the highly-reputed Central Swedish Mines. The ore is first reduced in small furnaces with charcoal; the resulting pure cast iron is then melted in small crucibles, and the suitable chemicals added. This method ensures correct mixing, which is important for the subsequent heat treatment, and it is easy to prevent dross finding its way into the steel, which is important, because, should dross be allowed, when the surface of the steel is afterwards subjected to high pressure the dross present would certainly cause scaling. The races are hardened, and then tempered, so as not to impair the elasticity.

Ball bearings do not require a great amount of lubricant, but it is very important that they should be protected from rust. To this end the housings should be kept full of grease, which must be chemically

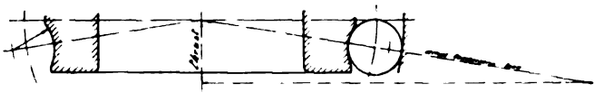

Fig. 3.

neutral, that is, free from acid and alkali. Here are a few simple tests:

(1) Saturate a piece of cotton wick in the oil to be tested, and wind it round a brightly-polished steel shaft, expose to the sun for 24 hours, and if the surface of the steel shaft is affected, it is certain that the lubricant contains acid or alkali.

(2) Mix equal weights of soda water (soda and water in equal proportions) and the lubricant to be tested, shake it well in a test tube, and allow the mixture to rest. If acid is present, it will be deposited as a sediment, the amount indicating the quantity present in the lubricant.

(3) Mix one part of lubricant and six parts of boiling water; the presence of either acid or alkali can be detected by means of litmus paper. If blue litmus paper turns red, acid is present, and if red litmus paper turns blue, alkali is present.

For ordinary purposes a mixture of vaseline and vaseline oil is good, but for high speeds, a good mineral oil gives the best results.

So important is it that the lubricant should be suitable, that most of the ball bearing firms of good repute test the samples of their customer's lubricant free of charge. In some difficult cases the above tests are not sufficient. It is essential that no chalk should be contained in the grease. It is also advisable to have the inside of the axle-boxes perfectly clean, and this is secured by the use of wire brushes revolving at a high speed. It is also necessary to have moisture and grit-proof felt washers, which are made small in inside diameter, so that when in position they press against the shaft.

The application of ball bearings to the axles of tramcars has passed the experimental stage, and the above remarks the writer hopes will ensure fairness in their use. It is not unusual to come across ball bearings applied to the motors of the cars, and everything that should be rigidly guarded against (with regard to the design of housing) applies owing to the small amount of information of practical value yet published. The idea of substituting the rolling of balls for the sliding of surfaces is old enough, but it is only during the last 20 years that it has been possible to produce good practical bearings of the sort. There is now no excuse for sticking to methods belonging to the past. With the enforcement of increased efficiency, ball bearings have become essential.

New Cars for Leeds.—Application is to be made to borrow £22,500 for the provision of 25 cars. The tramway committee estimate that between 50 and 70 will be required in the near future.

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TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION.

PROGRAMME OF THE ANNUAL CONGRESS.

The programme of the annual congress of the Tramways and Light Railways Association, to be held at Newcastle-on-Tyne, on July 16 and 17, is as follows:

THURSDAY, JULY 16.

10 a.m.—Reception by the Lord Mayor and members of the Tramways Committee at the Connaught Rooms, where the meetings will be held.
11 a.m. to 1 p.m.—Papers and discussions.
3 p.m.—Excursion and garden party given by the Corporation at Jesmond Dene.
7-30 p.m.—Banquet at Tilley's Rooms, given by the Corporation.

FRIDAY, JULY 17.

10-30 a.m. to 1 p.m.—Papers and discussions at Connaught Rooms.
2-35 p.m.—River trip provided by the Newcastle Tramways Committee.
4-30 p.m.—Arrival at Tynemouth Pier.
6-30 p.m.—Return by the North Eastern Railway's electric trains, special cars being provided by the Tynemouth Tramways.
9 p.m.—Supper and dance at Tilley's Rooms, given by the Northern General Transport Company.

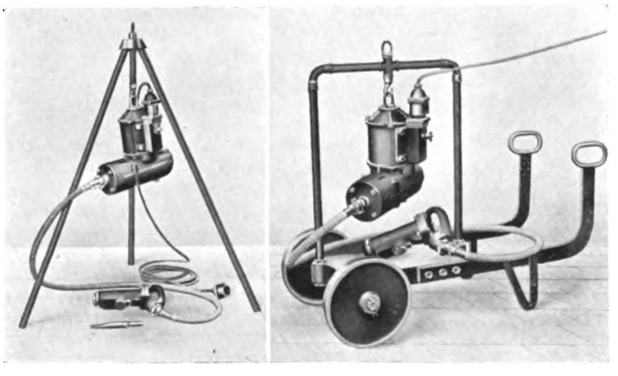
The head-quarters will be the Central Station Hotel. Special saloons and restaurant cars will be reserved on the train leaving King's Cross Station on Wednesday, July 15, at 2-15 p.m., arriving at Newcastle at 7-57 p.m.

Further particulars may be obtained from the Secretary, Mr. A. de Turckheim, Caxton House, Westminster.

ELECTRO-PNEUMATIC HAMMER.

The portable electric power hammer which has just been added to the list of electrically-driven tools, manufactured by Messrs. S. Wolf and Company, is rapidly finding favour in all branches of engineering. Until the advent of the "Fein" hammer, as it is called, the only practical power hammers were of the pneumatic type, the use of which necessitates the installation of a suitable air compressor with its attendant prime mover, air reservoir, and pipe line. It is obvious, therefore, that an electric hammer which can be connected to any available lighting or power circuit that is easily transportable has a great advantage over the older system, quite apart from the questions of first cost and maintenance charges, both of which are largely in favour of the electric system.

The "Fein" hammer is a combination of a pneumatic hammer and an electric motor-driven air compressor. The whole outfit is reduced



Electro-Pneumatic Hammer.

to the simplest possible form with a view to extreme portability. The actual blows from the hammer are caused by the rapid alternate withdrawal and admission of air behind the piston which carries the hammer head itself, thus causing a series of quick-succession blows, the strength of which can be varied at will. The necessary alternate rise and fall in pressure is produced by means of a small air pump which is directly connected to a ¼-H.P. standard electric motor, the connections and methods of control being identical with those of the other electrical tools manufactured by Messrs. Wolf and Company. Suitable eyebolts are provided, so that the machines can be suspended in lifting tackle where required. Our illustrations show two methods of suspension, a light tripod for outdoor work and a light two-wheeled truck for workshop use.

LEEDS RAILLESS TRACTION COSTS.

As the R.E.T. Construction Company's system is in use at Leeds, it is of interest to append the financial results of operation there for the year ended March 31 last, together with the figures for the preceding year. The figures, omitting shillings and pence, are taken from the annual report of Mr. J. B. Hamilton, the general manager of the Corporation tramways undertaking.

EXPENDITURE.

Average per Car-Mile.	Year March 31, 1913.		Average per Car-Mile.	Year March 31, 1914.
d.	£	*To Traffic Expenses.*	d.	£
1·51	507	Wages of motormen and conductors	1·55	485
·42	141	Cleaning and oiling cars	·45	141
·01	5	Ticket cheque..	·02	5
·04	12	Uniforms and badges	·04	13
·01	3	Licenses	·01	3
1·99	668		2·07	647
		General Expenses.		
·03	9	Rates	·07	24
·12	41	Insurances (workmen's compensation, fire, and health)	·13	41
15	50		·20	65
		General Repairs.		
·05	19	Electrical equipment of line ..	·08	25
2·07	694	Cars (including tires)	2·04	638
2·12	713		2·12	663
		Power Expenses.		
·39	131	Total miles run .. .. 76,398 Consumption per mile, units, ·87 Units used .. .. 66,466 Works cost .. ·493d per unit	·44	136
4·65	1,561	Total working expenses	4·83	1,511
2·01	674	Gross profit	2·01	629
6·66	£2,236		6·84	£2,140

NET REVENUE ACCOUNT.

Dr. 1913.		*To Interest and Sinking Fund Charges.*	1914.	
d.	£		d.	£
·80	271	Interest on capital	86	271
1·31	440	Sinking fund	1 41	440
2·11	711		2 27	711

There was thus a deficiency of ·26d. per mile or £82. The total mileage was 75,066.

THE INSTALLATION AT DUNDEE.

The general manager of the Brighton Corporation Tramways has reported to the Tramways Committee that in consequence of statements which had been circulated concerning the alleged discontinuance of the trackless trolley service at Dundee, he had communicated with the general manager of the Dundee City Tramways, from whom he had received the following reply:

"In reply to your inquiry regarding the reported decision of my committee to discontinue this system on the Clepington Road, Dundee, I beg to submit as follows: The system has been in operation for one year and eight months, and so far as working is concerned it has been an unqualified success. It has been as reliable as an ordinary tramway service, and the working expenses have been very low. At busy times, such as week-ends, we have evidence that heavy rushes can be dealt with by this system. With two cars in service the drawings averaged for one day 25·31d. per mile run. The cause of trouble has been the roadway. To begin with, I understand it was the worst road in the city, with no bottoming beyond the natural subsoil. The Roads Department had, the year before it was proposed to instal the railless system, provided a sum in their annual estimates to put this road in a condition suitable for modern traffic, but the money was not spent. Some money has been spent on the roadway since the cars have been operating, but the road is not suitable; consequently the Tramways Committee have unanimously resolved to discontinue the service until the road is put in a reasonably suitable condition.

Lacroze Tramway Company's Projected Subway.—Messrs. Miguel and T. Lacroze, directors of Lacroze Tramways Company, Buenos Aires, have started on a tour of Europe and the United States, in order to inspect underground railway and electric tramway systems, in view of a scheme to extend the Lacroze undertaking. London will be visited, and the tour will end with an inspection of the tramway construction exhibits at the Panama Exposition.

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BERLIN TRAMWAYS.

In spite of the so-called craze for State or official control of all public services that is popularly supposed to rule in Germany, the city of Berlin does not offer in tramway matters at least a notable instance of this tendency.

For many years the tramway lines in the German metropolis were entirely in the hands of private enterprise, and it has only been at a comparatively recent date that the municipality itself began to build and work tramways.

These have—as might be expected—proved of considerable service to the public, and fairly remunerative to the municipality, though naturally not so profitable to operate as the company-owned lines which form a network of 368 miles of track, as compared with 21 miles only of the municipal lines.

The gross receipts per mile of track on the Great Berlin Tramways Company's system for 1912 averaged a little over £6,500, while they were less than £5,000 for the municipal lines. The Berlin municipality had the right and expectation of taking over the company-owned lines in the year 1919, but after long and complicated negotiations—into which the State also entered, under the laws which give it power to grant concessions independently of the municipality—a final agreement has been reached between the company and the municipality.

By this agreement, which is in force until the end of 1939, the company pays to the municipality a sum of not less than £1,150,000 for their operation has not so far materially affected the traffic results of the tramways—a continued increase in the latter being shown for each successive year of the past decade, though the net profits for last year are somewhat less than during 1912.

We append a table giving a summary of the chief financial figures of the Great Berlin Tramways Company since 1904, from which may be gathered the continued progress of the undertaking. It shows a tolerably prosperous state of affairs, as would be expected from a tramway system operating in so populous and busy a centre, but hardly promises the "gold mine" that electric tramways were once thought to be, before all the working conditions, artificial as well as natural, were fully realised.

The second and smaller table shows some of the traffic statistics for the same period, and gives a good idea of the steady progress made by this system in the decade mentioned.

Referring to the first table, it will be seen that no change has been made in the ordinary share capital throughout this period: two series of debentures have been gradually paid off, and two other series issued during the last two years, part of the proceeds from the latter being exchanged for shares in the Berlin Omnibus Company, so that the Tramway Company has taken the wise step of interesting itself in the otherwise competitive undertaking.

Total working expenses in relation to total income reach a percentage of 58·64 for 1913, as compared with 56·66 for the previous year. The wages bill, including cost of labour on maintenance, etc., amounts in all to £811,551 for 1913: this is equivalent to 64 per cent. of the total

BERLIN ELECTRIC TRAMWAYS: FINANCIAL RESULTS FOR THE YEARS 1904-1913.

	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913
	£	£	£	£	£	£	£	£	£	£
Share capital	5,004,120	5,004,120	5,004,120	5,004,120	5,004,120	5,004,120	5,004,120	5,004,120	5,004,120	5,004,120
4½ per cent. debentures	—	—	—	—	—	—	—	—	—	1,096,650
4 " "	74,350	64,950	55,150	44,950	34,350	23,350	11,900	—	1,500,000	1,645,575
3½ " "	386,650	336,950	285,510	232,265	177,160	120,130	61,100	—	—	—
Loans on mortgage	92,050	86,300	86,300	86,300	86,300	86,300	91,300	91,300	86,300	86,300
Receipts	1,571,205	1,714,458	1,758,716	1,829,622	1,924,817	1,930,537	2,073,106	2,174,202	2,279,198	2,288,765
Expenses	869,383	937,405	948,442	1,012,753	1,078,497	1,058,236	1,152,232	1,195,618	1,291,410	1,342,226
Gross profit	701,882	777,053	810,274	816,869	846,320	872,301	920,934	978,584	987,788	946,539
Renewals, guarantees, insurances, equalisation of taxes, amortisation, etc.	172,056	194,845	203,941	209,489	233,375	265,129	281,530	270,952	254,465	256,649
Debenture interest	16,821	14,764	12,633	10,425	8,137	5,767	3,544	1,379	57,500	77,089
Interest on loans	3,681	3,535	3,447	3,447	3,447	3,447	3,528	3,722	3,558	3,522
Contribution to municipality	107,359	139,099	155,802	159,545	177,003	175,155	195,321	217,306	221,253	194,995
Reserve fund	361,694	395,071	429,718	466,943	505,269	519,218	534,075	550,170	567,530	585,810
Dividend: per cent. of share capital	7½	7¾	8	8	8¼	8¼	8½	8¾	8½	8

BERLIN ELECTRIC TRAMWAYS: WORKING STATISTICS FOR THE YEARS 1904-1913.

	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913
Length of track in use (miles)	309·71	314·89	317·62	325·89	328·09	329·60	333·44	340·50	353·20	367·92
Round trips made	7,051,890	7,454,567	7,589,361	7,685,849	8,001,368	7,930,771	8,254,570	8,505,574	8,747,758	8,788,074
Miles run (in millions)	46·57	50·59	51·79	53·57	56·85	56·90	60·76	63·42	65·34	66·53
Passengers carried (in millions)	332·7	350·5	364·1	378·2	397·2	396·61	427·7	447	463·3	466·3
Cars in service (December 31)	2,426	2,433	2,442	2,494	2,495	2,511	2,628	2,737	2,848	2,908

the extension of the franchise, and also bears the cost of all street works and improvements required in connection with the system. All this, of course, is in addition to the percentage already paid each year for a long time past, as a contribution or rental, to the municipality.

The latter now receives from the company 8 per cent. of its gross receipts, and should the present universal fare of 1½d. for any distance be increased, as provided for by mutual agreement between the company and municipality, then the percentage is to be increased to 10 per cent. If, moreover, the net profits are more than 12 per cent. on part of the share capital of the company, and more than 6 per cent. on the rest, then one-half of any such excess is to be paid to the municipality; and when the profits are more than 10 per cent. on the whole of the capital, two-thirds of the excess must be paid to the municipality.

The latter has the right to take over the whole system in 1920, 1930, 1935, or 1940 on varying terms of payment; in the earliest event on condition of paying not less than 200 per cent. nor more than 250 per cent. of the share capital; and at the latest date named (1940) on terms of paying for permanent way, etc., land and buildings, and rolling stock, at their book value (less 40 per cent. for permanent way) or else according to a valuation.

While therefore sharing very extensively in the profits of the tramway company's undertaking, the Berlin municipality has at present only a small direct interest in tramway working; and a policy of this kind may prove by no means unwise when the possibilities of competition in other forms, such as motor omnibuses and tubes, are fully considered.

There are motor 'buses, and plenty of them, in Berlin, but apparently expenses. The cost of electric current similarly amounted to £271,347 or 20·2 per cent. of the total expenses.

The cars in stock at the end of 1913 included 1,763 motors (of which 840 are four-axled and 923 two-axled) and 1,145 trailers. Of the latter, 804 are of the ordinary closed type, 212 open or closed according to the season, and 129 open.

Together with a total number of 298 service vehicles (including tower wagons, salt cars, rail carrying cars, sand cars, fire engines, cranes, and numerous automobile vehicles) the entire rolling stock stands in the books of the company at a total of £1,965,696 as at the end of 1913. The staff and personnel employed reaches a total of 12,540 individuals.

WHITSUNTIDE TRAFFIC IN LONDON.

The allied omnibus and underground railways carried on Whitsun Monday in all over half-a-million more passengers than last year. The London General Omnibus Company conveyed 2,725,088 passengers, of whom about 60,000 went to Epping Forest, in 300 omnibuses. For the Underground services the figures were: District Railway, 330,000; London Electric (Bakerloo, Piccadilly, and Hampstead lines), 256,000: Central London, 110,000: City and South London, 78,000. The London United Tramways carried 401,000, and the Metropolitan Electric Tramways, 476,000. Thus a grand total was reached of 4,376,000. The receipts of the London County Council Tramways were over £10,000.

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PROPOSED PURCHASE OF BRISTOL TRAMWAYS.

Committee and Expert Reports.

The scheme for the purchase by Bristol Corporation of the tramway system of the Bristol Tramways and Carriage Company has advanced considerably during the past month. Early in May a House of Lords' Committee passed the bill promoted by the Corporation to empower the latter to work the tramways when purchased. On May 20 a volume was published containing the reports of the Tramways Option Committee and Mr. J. B. Hamilton, Mr. J. F. C. Snell, and Mr. J. M. McElroy on the subject, as well as an historical tramway report by Mr. E. J. Taylor, the town clerk, a table of information regarding municipal tramways in towns of over 180,000 population, abstracts of the Board of Trade returns regarding municipal tramways, and a reprint of the committee's report to the Council of August last year. The Tramways Option Committee in their new report, after considering the reports by the experts and all the circumstances, recommended the Council to accept the bill as amended by the House of Lords, subject to a poll of the city being favourable to the acquisition of the tramway undertaking. On May 26 the Corporation by 46 votes to 30 adopted the report of the committee, and the next step is the poll of the ratepayers. We give below abstracts of the reports.

REPORT OF THE TRAMWAYS OPTION COMMITTEE.

The Council will recollect that at their meeting on September 9 last they adopted a report from your committee recommending the promotion of a bill in Parliament to enable the Corporation to work any tramways which they might hereafter acquire.

The right of the Corporation to acquire the tramways within the city at the time the bill was deposited stood as follows :

M.	F.	Yds.	
25	0	101	Purchasable in May, 1915, on the terms of sec. 43, Tramways Act, 1870.
1	2	29	The Hanham Light Railway, purchasable in November, 1928, upon terms of paying the fair market value as a going concern, but without any allowance for compulsory purchase.
2	0	88	The remainder of the lines within the city purchasable in August, 1946, on light railway terms.
28	2	218	

In addition there are various short lengths of tramways outside the city, with a total mileage of 2 miles 5 furlongs and 45 yards, which will be purchasable by the local authorities of the areas in which they are respectively situate, in 1918 and 1946.

The bill came before a Select Committee of the House of Lords on April 28 and 29 and May 1, and the only petitioners against the bill were the Bristol Tramways and Carriage Company.

The Select Committee, however, decided that the bill might proceed subject to a clause being inserted placing upon the Corporation the obligation to purchase the tramways in respect of which the Corporation have the option to purchase in May, 1915, and also to purchase at the same time, the remainder of the company's tramways upon terms to be agreed with the company, or failing agreement as might be fixed by arbitration.

The clause which the Select Committee added to the bill in order to carry out their decision provides that the terms of purchase are to be : As to the part of the undertaking within the city (other than the light railway), the terms of section 43 of the Tramways Act; as to the remainder of the undertaking (including the light railway), such terms as failing agreement shall be determined by arbitration. The payment to be made shall, failing agreement, be determined by an engineer or other fit person nominated as arbitrator by the president of the Institution of Civil Engineers.

The Corporation are therefore in the position that if they desire to proceed with the bill as amended by the House of Lords' Committee, and the bill receives the Royal Assent, they will be under an obligation to purchase in the year 1915 the whole of the tramways belonging to the Tramways Company.

Your committee have therefore had to carefully consider whether they should advise the Council to proceed with the bill, or whether the bill should be no further proceeded with in the present session of Parliament.

The committee then mention the various documents which they have had before them. With reference to the information obtained from other towns, they say that it will be seen that tramways owned and worked by local authorities are eminently successful from every point of view. Your committee's inquiries extended to every borough in the United Kingdom (outside London) with more than 180,000 inhabitants owning and working tramways, comprising Belfast, Birmingham, Bolton, Bradford, Cardiff, Glasgow, Hull, Leeds, Leicester, Liverpool, Manchester, Newcastle, Nottingham, Portsmouth, Salford, Sheffield, and West Ham; and it is a significant fact that with the exception of Dublin (where the option to purchase has not yet arisen), Edinburgh (where the Corporation own but lease the tramways to a company), Stoke-on-Trent (a recent amalgamation of six small towns), and Bristol, there is no borough in the United Kingdom with a population of 180,000 inhabitants which does not both own and work the tramways.

The committee next describe high qualifications for giving advice and the long experience in tramway matters of the three experts consulted, Mr. J. B. Hamilton, general manager, Leeds Corporation Tramways; Mr. J. F. C. Snell, consulting engineer; and Mr. J. M. McElroy, general manager, Manchester Corporation Tramways. In regard to the supplemental report of Mr. J. B. Hamilton and Mr. J. F. C. Snell, it has been prepared at the request of your committee since the House of Lords' Committee gave their decision upon the bill, and to this report there is attached a memorandum by Mr. McElroy generally approving their reports and figures.

Your committee have given the fullest and most careful consideration to the whole question in the light of the reports of their experts and of the information obtained from other towns, and having regard to those reports and to the opinions expressed by the experts that there is no known form of traction which can provide the travelling facilities required by the public of Bristol, as efficiently and economically as tramways, your committee are of opinion that the Corporation ought in the best interests of the ratepayers to acquire the Bristol tramways undertaking, and they therefore recommend the Council to accept the bill as amended by the House of Lords, subject to a poll of the city being favourable to the acquisition of the Bristol tramways undertaking.

If the Council approve of this recommendation, your committee further recommend that the Council should at once proceed to ascertain the opinion of the parochial electors in manner provided by the Borough Funds Act, 1903, on the question of the purchase of the undertaking.

MESSRS. HAMILTON AND SNELL'S REPORT.

In the course of their report these gentleman say :

We have carefully considered the important matters committed to us, and now have pleasure in reporting on them. These several matters are as follows :

"1. The valuation of that part of the tramways undertaking subject to purchase in May, 1915.

"2. The valuation of the remainder of the tramways undertaking.

"3. The supply of energy to the tramways.

"4. The probable income to the Corporation if they should acquire and work the tramways, and the probable cost of so doing.

"5. The risks which might arise from trams becoming an unpopular form of traction in Bristol and in similar large cities.

"6. The cost of running competing forms of traffic such as railless cars and motor-omnibuses, and the advantages or disadvantages of such forms of traction.

"7. Whether the Corporation should proceed no further in the matter and should leave the tramways in the present company's hands under the terms of the 1870 Act; or

"8. Whether the Corporation should purchase the undertaking and work it themselves; or

"9. Whether the Corporation should purchase the undertaking and lease it to the company; or

"10. Whether the Corporation should enter into an agreement with the company to refrain from exercising the option to purchase for further periods of, say, seven, fourteen and twenty-one years respectively, the company agreeing to pay an annual rent in consideration thereof; and in such case (*a*) what rent the company should pay, or, alternatively, (*b*) what lump sum should be paid by the company in respect to such arrangement."

The report is divided into three sections.

Section I.

(a) Valuation of the Undertaking Purchasable in 1915.

The Company would not (as they stated "for the present") give permission for any inspection of their power houses, depots, rolling stock, etc. This refusal has made it much more difficult for Mr. Snell to make an inventory which must be the basis of any valuation. Fortunately, there have been many publications in various engineering journals by various responsible chief technical officers of the company from time to time, which have enabled a very comprehensive and sufficient inventory to be made for present purposes. The necessary descriptions of the plant and apparatus have been ascertained without risk of serious error, and have been arrived at in great detail. If the Corporation proceed to purchase the undertaking it will be necessary, and will save much expense, if a properly detailed inventory is then made and agreed to between the parties to the arbitration.

Information as to the various car sheds and depots has been obtained by outside inspections, from detailed plans deposited by the company in the city engineer's office, and from detailed information provided by both Mr. Addie (the city valuer) and Mr. Burge.

Particulars of the underground cable network have been obtained through Mr. Faraday Proctor (consulting city engineer), descriptions published by the company, and from a general engineering knowledge of what the system must necessarily be. For the overhead equipment,

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Mr. Faraday Proctor had an accurate survey made which enabled a fairly accurate inventory to be made.

We have been able to see several sections of track under repair, and were thus able to ascertain technical particulars of its construction. The city engineer had measurements made of the respective amounts of wood and granite pavings within the tramways limits.

We have examined the rolling stock so far as has been possible, and dimensions and leading particulars of the cars have been available from published records.

Particulars of road improvements have been forwarded by the town clerk and the city engineer, and notes have been made as to other charges generally included in a tramways valuation.

The method of assessing the "then value" of any tramways is generally arrived at by the following procedure. The cost of replacing the tramway at or about the date of the purchase by the Corporation is first ascertained, regard being had to the then costs of materials and labour. It is then necessary to proceed to depreciate it to its probable value in May, 1915. For this purpose recourse has been had to information obtainable from various official publications and other sources as to the dates when the various parts of the undertaking were actually constructed. Having regard to the proper and probable useful lives of the various components of the undertaking, it is then possible to ascertain the "then value" of the undertaking. All this has been worked out in great detail.

In this valuation all the depots used by the tramways department have been included in the first (1915) section, whether within or without the city, as, in view of previous decisions, the Corporation would probably have to purchase them as being "suitable to and used for the purposes of the undertaking" within the city.

It will suffice for the purposes of this report to base all conclusions affecting the future finance of the (municipally-owned) undertaking upon an estimated valuation of, say, £600,000. We feel convinced that it will be absolutely safe on this valuation to base all deductions as to the cost of working the tramways by the Bristol Corporation.

(b) Lines not Purchasable in 1915.

The acquisition of the lines purchasable after 1915 would not seriously affect the above-named figure of £600,000, especially seeing that all the depôts, as before stated, have been included in the principal (1915 lines) valuation.

(c) Supply of Electrical Energy to the Tramways.

The cost of generation at Counterslip is sure to be low, as that site enjoys facilities for condensing and coal handling, and the generating plant is of a reasonably economical type. On the other hand, there has been a large expenditure by the company in copper laid down under the streets to enable the energy to be conveyed at the low pressure of about 550 volts to such distant points as Westbury or Hanham. It is premature to determine whether it would be advantageous for the Council to shut down the Counterslip power-station and to concentrate all the generating expenses at Avonbank. It would be necessary to ascertain first what is the actual cost per unit delivered from Counterslip. But *primâ facie* many advantages ought to accrue to the Corporation from concentration at Avonbank, such as (*a*) improved load factor, (*b*) reduced staff, (*c*) generation at high pressure three-phase and cheaper transmission to the outlying parts of the tramway system, (*d*) a large credit as a consequence from the heavy low-tension cables recovered from the streets.

On an estimated output for traction purposes of 8,500,000 units per annum, the price at which the electricity department could afford to supply the tramways department would be such as probably to warrant the tramways obtaining the whole electrical supply from Avonbank. The additional income to the electricity department and the increased output and improved load factor would react so favourably on the present output from Avonbank for general city purposes as to result in a general reduction in costs per unit for all purposes.

Section II.

Traffic Costs, Probable Receipts, and Risks of Competition from Other Systems of Traction.

The rapidity of travel, cleanliness, and safety in operation of electric traction has been justified in its adoption by the enormous demand for travel created and supplied by it, particularly in residential and industrial centres. Modern conditions of city and suburban life certainly demand that, quite apart from railways, there shall be a cheap, frequent, safe, and comfortable form of street transit, and up to the present no other form of traction can compete in these essentials with tramways operated on the overhead electric system.

Various forms of street transit have been developed to meet the requirements of special districts within the past four or five years. The principal ones may be summarised as (*a*) motor omnibuses, petrol or steam driven, petrol-electric, and electric battery; and (*b*) railless trolley cars.

(a) Motor Omnibuses

The very great advance in design and construction of motor omnibus equipment during the last two or three years is quite in line with the simultaneous improvements in petrol engines, carburettors, gears, axles, etc., for motor cars. The passenger capacity of the vehicles, however, in this and all other forms of vehicles which do not run upon rails is practically confined to about 30 to 34 passengers. An insuperable disadvantage from the financial point of view results. This, when considered in relation to the rapid conveyance of large masses of people at rush times, is a very serious drawback.

The total cost of operation of a tramcar in Bristol, including interest, sinking fund, etc., is at least 1½d. per mile less than that for a motor 'bus. On the assumption that the maximum demand for conveyance occurs for 20 per cent. of the period during which the vehicles run, and that at other times the 'bus of 26 capacity would attract and convey as many passengers as a tramcar of 52, the difference in total cost in the provision of a motor 'bus service as compared to a tramway service on the estimates of 1915 would be £78,872 more for motor 'buses than for tramways, as shown in Table No. 1.

Table 1.

Extra Cost of Total Expenses of Motor Omnibuses in Bristol Compared with Tramways.

Miles run upon tramways purchasable in 1915 (car-miles)		5,239,656
Additional mileage to be run to carry same number of passengers in event of 'buses being installed = ⅕ of the above		1,047,931
'Bus-miles		6,287,587
Total expenses motor 'buses. 6,287,587 at 10d. per mile	=	£261,982
Total expenses tramways. 5,239,656 at 8·387d.	=	183,110
Extra cost of working		£78,872
Annual net free surplus from tramways	£37,073	
Annual deficit from motor 'bus operation	41,799	
		£78,872

In London, the conditions are exceptionally favourable. Even in London, however, although the business is conducted on an extraordinarily large scale, the costs of operation for 1912 amounted to 9·76d. per mile, and this will now, owing to the lately advanced price of petrol, be considerably increased, probably by at least an additional ½d. per mile.

The costs of operation in provincial towns, owing to heavier gradients, etc., have admittedly always been higher than in London, but the period during which the modern types of motor omnibuses have been in operation by local authorities is in most cases insufficient to give an accurate idea of what the costs will be in the course of a year or two when the vehicles will be requiring more repairs and maintenance than in the earlier stages.

As examples, however, the figures may be quoted as set out in Table No. 2.

In the case of Halifax the vehicles are all of the most modern type.

Table 2.

Motor Omnibuses.

Extracts from published accounts of the Corporations of Halifax, Keighley, and Eastbourne, 1912-13. Expenditure per 'bus-mile run.

	Halifax. Per mile. d.	Keighley. Per mile. d.
Traffic expenses	3·545 ..	4·212
General expenses	·497 ..	·930
Repairs (including tires)	3·386 ..	4·380
Petrol	1·917 ..	2·871
Interest	·322 ..	·290
Garage rent, etc.	·833 ..	—
Sinking fund and depreciation ..	2·198 ..	3·322
Total	12·698 ..	16·005

	Eastbourne. Per mile. d.
Running expenses	6·92
Repairs, etc...	3·21
Depot expenses	·19
Management expenses	·76
General expenses	·06
Interest and sinking fund	3·25
Total	14·39

The routes in Halifax and Keighley are somewhat hilly, and in this respect typical of at least a portion of the routes in Bristol. Further, a very careful census has been taken of the routes in Bristol which are served by motor 'buses. The policy very naturally has been that the

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more densely populated routes should be served by the tramway system, and that only in cases where there is not sufficient traffic to justify the construction of a tramway, or on account of the gradients, character of the district, or narrowness of the streets, 'buses have been supplied. The census taken by Mr. Hamilton shows that on the occasions when it was taken the average earnings on the 'bus routes in Bristol were only 6·64d. per mile.

These remarks apply equally to petrol-electric cars and in respect of limitation of passenger capacity to any form of vehicle which carries its energy in storage batteries.

(b) Railless Electric Traction.

This form of traction as compared with motor 'buses has the very great advantage of being more reliable. It is probably from 2d. to 2½d. per car-mile more economical in operation than motor 'buses.

It must be sufficiently obvious, however, that on account of its limitation in carrying capacity it cannot be accepted as a substitute for electric tramways, except in districts where the population is comparatively sparse or where the physical nature of the streets makes it impracticable to put down tramway lines.

In considering tramways versus other forms of street transit, it must not be forgotten that in the case of tramways the working cost per mile is inclusive of the total maintenance, not only of the tram rails, but also of a considerable portion of the street, whilst in the case of motor 'buses or railless traction there is nothing included for the inevitable wear of the roadway which must ensue as a result of the passage of the vehicles. In several cases during the present session, Parliamentary Committees have imposed ¾d. per mile run as a charge upon promoters of motor 'bus and railless traction routes for maintenance of roads. In addition to this, costs of widening have also been put upon them. Applying ¾d., which is apparently the estimate of the damage to the roads by these types of vehicles, a further annual expense of £9,824 must be charged to these forms of traction as applied to Bristol.

In our opinion there does not exist at the present time any means of transit which can be adapted for the travelling needs of a great and populous city like Bristol in the same way as a tramway can provide for them.

It is essential that if low fares, which are so necessary and promote travel so much, are to be granted a large and commodious vehicle must be provided, and the cost of such provision should be as low as possible.

All these advantages are present in overhead electric tramways, and for this reason it stands at the present time, and as far as we can forecast will continue to be without any serious competitor, as the most economical and convenient means of transit for large centres of population.

Mr. Hamilton has given consideration to the length of the stages at the various fares now prevailing. He is of opinion that a reduction of these fares to get into line with the fares of many towns, viz., about two miles for one penny, with the addition of a more frequent service, would lead to a very considerable increase in travel and a greater resultant revenue.

An examination of the returns of all the towns from 200,000 inhabitants upwards (with the exception of Edinburgh, which because it mainly has cable tramways and also has a large number of summer visitors, is therefore unreliable and has not been included) shows that the populations of these towns for the year 1912 have been carried 170 times, whilst in Bristol the average is only 145.

As the average fare per passenger is 1·05d., the difference in returns if Bristol should rise to the above average would be an increase in revenue of £39,484, as shown in Table No. 3.

Table 3.

Difference in returns in event of number of times population carried per year in Bristol attaining to average number for other large towns.

Average other towns	170
Bristol	145
Difference	25 times.
Average fare per passenger	1·05d.
Number of times extra (as above)	25
Population	361,000

$$\frac{1{\cdot}05\text{d.} \times 25 \times 361{,}000}{240} = £39{,}484.$$

In the estimates of the development of traffic Mr. Hamilton has not assumed that this would occur, but he does not see any reason why Bristol should not be above the average referred to rather than below it.

For the purposes of estimating for 1915 the probable revenue to be earned, the mileage to be run, and the number of passengers carried, definite figures as to these items are published yearly in the Board of Trade returns. In Table No. 4 the figures are given for receipts and mileage for 1909-10-11 and 12, and the annual increases in these figures have also been taken out.

Table 4.

Receipts Earned and Mileage Run 1909-1912, and Estimated Receipts Earned and Mileage Run 1912-15.

Approximate Percentage of Annual Increase.	Receipts.	Percentage of Annual Increase or Decrease.	Mileage.
	£		
1909	211,048	1909	5,858,575
3·14 per cent.	6,629	Inc. 1 per cent.	56,138
1910	217,677	1910	5,914,713
3·43 per cent.	7,473	Dec. 2 per cent.	148,402
1911	225,150	1911	5,766,311
2·33 per cent.	5,390	Inc. 2 per cent.	134,355
1912	230,540	1912	5,900,666
3 per cent.	6,900	Inc. 3 per cent.	177,018
1913	237,440	1913	6,077,684
2 per cent.	4,748	Inc. 2 per cent.	121,553
1914	242,188	1914	6,199,237
2 per cent	4,843	Inc. 2 per cent.	123,984
1915	247,031	1915	6,323,221
Add estimated receipts from parcels and advertising on cars	5,000		
	£252,031		6,323,221

Analysis of Mileage and Receipts.

	Mileages.
Total (estimated 1915) cars and 'buses	6,323,221
Deduct 'buses—1461 × 365 = 533,265	533,265
Total cars	5,789,956
Deduct cars not purchasable 1915 .. .. .. (Earnings 7d. per mile)	550,300
Total—year 1915 tramways purchasable 1915 ..	5,239,656

	Receipts.
Total cars and 'buses	£252,031
Deduct 'buses—533,265 at 6·64d. .. = £14,765	
Add increase of 7 per cent. (1912-15) on above .. .. .. = 1,033	
	15,798
	£236,233
Deduct cars not purchasable 1915: Route length, six miles at £2,500 per mile = £15,000	
Add increase of 7 per cent. on £15,000 (1912-15) 7 per cent. .. .. = 1,050	
	16,050
	£220,183

In explanation of Table No. 4, for the year 1913 an estimated increase in revenue over that of 1912 of 3 per cent. has been assumed. For the two years following a 2 per cent. increase is estimated in each year. This brings the total amount from the tramways department to £247,031 in the year 1915. To this amount there must be added receipts obtained from conveyance of parcels and goods, from mails, and a large sum from advertising on cars.

The Board of Trade returns for 1911 show gross receipts from passengers £225,149, and from parcels and mails £3,683. Neither of these can possibly include advertising. It has been decided to take the low figure of £5,000 for advertising, parcels, and mails. Five thousand pounds added to the receipts from passengers gives a total revenue for tramways on all the lines and motor 'buses as existing at present £252,031.

The probable mileage has been dealt with in the same way as the revenue, and gives a total figure of 6,323,221 for the year ending December 31, 1915.

The analysis of the mileage and receipts which should be deducted from the gross totals above referred to in respect of 'buses which are a portion of the tramways undertaking, and other lines which are not purchasable in 1915, are also shown in Table No. 4.

A very careful census, over several days, was taken of each stage on the various 'bus routes. From the returns thus obtained it is estimated that a total revenue of £15,798 is obtained annually from the operation of 'buses, which becomes a portion of the tramways revenue. The miles run by 'buses to earn the above receipts are 533,265. Deducting this amount from the gross mileage and receipts, a total number of miles of 5,789,956 is obtained, with a revenue of £236,233.

These are figures applicable to the whole of the tramway routes as at present existing.

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It is estimated that the portions of routes not purchasable in 1915 produce a revenue of £2,500 per mile of route, and that the cars operating on those parts earn an average of 7d. per mile. Adding the annual increase to the receipts and mileage for this section, as in the case of the tramways generally and the motor 'buses, a mileage of 550,300 is obtained with a revenue of £16,050. Deducting these items again, final figures of 5,239,656 miles and £220,183 are obtained.

This is the estimated mileage and revenue which will result from the working during the year 1915.

This represents 10d. per car-mile for tramway lines, excluding motor omnibuses and those portions of the routes inside and beyond the boundary of the city which are not purchasable in 1915.

The total figures are carried forward to Table No. 5.

TABLE 5.

Statement of estimated receipts and expenditure on tramways purchasable 1915. Year ended December 31, 1915.

RECEIPTS.

	£
Gross receipts for year ended December 31, 1915 (see Table No. 4) = 7 per cent. increase, 1912-15	220,183

EXPENDITURE.

Working expenses—		
Miles run by cars purchasable 1915 (see Table No. 4) 5,239,656 at 6·04d. (see Table No. 6) ..		131,864
Gross profit		88,319
Income tax on profits		3,746
		£84,573
Interest, sinking fund, and depreciation—		
Interest: 3·9 per cent. on £600,000 ..	= £23,400	
Sinking fund and depreciation calculated on lives of assets	= 24,100	
		47,500
Surplus		£37,073

The estimated surplus of £37,073, when applied to the estimated population, gives an average per head of population of £0·101, or 2s. 0¼d.

By comparing this figure with similar statistics for the larger towns in the kingdom, which are seven in number (London excluded, see Table No. 5a below) it is apparent that the ratio of the surplus allowed to the population served is much lower in the case of Bristol than the ratio of actual surpluses to populations served in these other large towns. The estimate therefore errs on the side of safety.

TABLE 5A.

Tabulated statement showing surplus profits earned by tramways in years 1912-13, in seven towns with greater populations than Bristol.

Name of Town.	Surplus Profits, 1912-13.	Population	Average Surplus Profits per Head of Population.
	£		£
Belfast	45,833	385,000	0·119
Birmingham ..	96,046	900,000	0·106
Glasgow	265,771	1,150,000	0·231
Leeds	102,302	500,000	0·204
Liverpool	133,858	838,000	0·159
Manchester ..	201,000	950,000	0·211
Sheffield	61,344	455,000	0·134
	£906,154	5,178,000	£1·164

Average £906,154 ÷ 5,178,000 = £0·175 = 3/6.
Bristol (estimated, 1915)—£37,073 ÷ 366,000 = £0·101 = 2/0¼.
Difference in "surplus per head of population" between average for seven larger towns than Bristol and the estimates for Bristol .. .. £0·074 = 1/5¾

The effect of applying the difference shown above, to the estimated population of Bristol:

1/5¾ × 366,000 = £27,069.

The working expenses, which are the first deduction from the gross receipts, are taken at 6·04d. per mile.

Mr. Hamilton has gone very carefully into the question of working expenses. These are not disclosed in the accounts of the company, and one must, therefore, judge from experience of the results obtained in other towns. In nine of the 17 towns to which reference has already been made the working expenses contained under the heading of "power" only include the working costs of generation without capital charges. In the other eight cases the energy is purchased at an inclusive price per unit, and, therefore, both interest and depreciation on the generating plant is included in the figure which appears in the working expenses.

As in the case of Bristol, at present the power-stations belong to the tramways undertaking, which would therefore pay interest and sinking fund upon them under their proper headings in the interest and appropriation account; therefore, to be comparable, only the working cost for energy should be included in operating expenses.

The average of the nine towns referred to as shown in Table 6 (here omitted) represents working expenses at 6·04d., and this agrees with an estimate taken out independently as to the working expenses in Bristol.

With regard to the working expenses of the towns not included in Table No. 6, it is quite possible to obtain a comparable figure representing the total working expenses, which will be very nearly correct, by taking the various other expenses as published, and adding an estimated figure for power costs as a substitute for the power costs published. Table No. 6a (here omitted) shows that the average cost for power for the nine towns with separate stations is 0·67d. per car-mile. This figure therefore has been adopted as the estimated works cost for power for the other eight towns with combined stations.

[Another table (No.6b) here included in the report gives the working expenses per car-mile for 41 towns serving populations of 100,000 and over. The figures are similar to those published in our analysis of tramway accounts. The average brought out was 5·906d. per car-mile.]

The report proceeds: Mr. Hamilton knows the working conditions in every one of the towns referred to, and he is thoroughly satisfied that even more favourable results can be obtained in the case of Bristol. He has, therefore, no hesitation in adopting this figure as an ample covering cost for working expenses.

The working expenses treated on this basis amount to £131,864, leaving a gross profit of £88,319. From this there is deducted income tax, which is put at a very high figure, viz., £3,746. Deducting this from the gross profit leaves £84,573.

The town clerk advises that the rate of borrowing might possibly be as high as £3 18s. per cent. This figure has, therefore, been applied to the valuation of £600,000, as in Section I.

Very careful and extended calculations have been made as to the amount of sinking fund and depreciation which should be provided. This has been taken out in the course of a calculation on the lives of assets for the purpose of valuation. The amount so obtained is £24,100, which, added to the interest, makes a total of £47,500. This again deducted from the £84,573, which is the amount which would be carried to appropriation account, leaves a net surplus of £37,073, which would be available for building up a reserve fund and in relief of rates.

SECTION III.

GENERAL CONCLUSIONS AND RECOMMENDATIONS.

We are satisfied there can be no doubt that the acquisition of the tramways undertaking by the City Council would be a perfectly safe and exceedingly profitable investment, as after payment of all proper working expenses, including capital charges and adequate depreciation, a surplus of £37,073 would remain. This would be available, wholly or in part, either to form a substantial reserve fund, or to be utilised towards the relief of rates. In addition to other considerations, it may be pointed out that the heavy gradients are more favourable to tramways than to a petrol 'bus service, with its frequent gear-changing dangers, that the frequent service of vehicles on tramway routes would render an additional service of motor 'buses quite superfluous, and that there is scarcely any case in which there exists a parallel route suitable for 'bus operation.

The estimates of tramway operating costs provide for all costs of repair and maintenance of paving between the tramway lines and for 18 in. outside each rail. The total area thus maintained by the tramways within the city is 243,394 square yards = fully 50 acres (137,708 square yards of wood and 105,668 square yards of granite). This maintenance is a considerable relief to the highways department's charges, whether the tramways be operated by the municipality or by a private company. Not only does all this saving vanish, but an increased highways maintenance cost of about £10,000 per annum, according to the Parliamentary Committees' estimates already referred to, would ensue from the displacement of the vehicles which travel upon rails by those which run upon and consequently wear the surface of the roadway.

The Corporation of Bristol may, therefore, decide to take the necessary steps to acquire the tramways undertaking at the date of the option without any hesitation as to this form of transit becoming obsolete or superseded by any other form which science has yet placed at the service of the public.

The committee desired to know whether our advice to them would be either (*a*) to proceed no further in this matter, but to leave the tramways in the present company's hands, or (*b*) whether the Corporation should purchase the undertaking and work it themselves.

We advise most emphatically that the Corporation should proceed by bill next session to obtain the necessary powers to work the tramways. There is every reason for obtaining powers to work the tramways.

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On the other questions as to whether the Corporation, after having obtained the powers, should decide to work the tramways themselves, or should lease them to the company, or should enter into an agreement with the company to refrain from exercising the option to purchase, in consideration of a rental to be paid by the company ; as we have said, there is nothing to be gained by determining at the present moment which course to pursue, and consideration of these alternatives can be better made in the interests of the ratepayers after the Corporation have obtained the necessary further powers.

If next year we are able to advise the Corporation to give notice to purchase in May, 1915, the Corporation would then be in a position to take over and also to work the tramways. Failing agreement as to the amount of the purchase money, which is not unlikely, an arbitration would have to be held before a referee appointed by the Board of Trade, a proceeding the preparations for which would involve a considerable time.

To sum up the points in our report, we find that—

(*a*) The estimated value of the whole of the tramways undertaking purchasable in 1915 in accordance with section 43 of the Tramways Act may be taken at about £600,000 as a covering figure.

(*b*) From the detailed investigation of the probable traffic receipts and costs of operation, there can be no doubt that a very substantial surplus of £37,073 will be obtained after payment of all working costs, capital charges, and proper depreciation.

(*c*) For the reasons already fully stated in section 2 of the report, there is no possibility of any of the other forms of traction which are at present known being able to provide the travelling facilities required by the citizens of Bristol as efficiently and economically as tramways.

(*d*) We therefore unhesitatingly recommend the Corporation to take the necessary steps by promoting a bill in Parliament during the next session to give them powers to work the tramways, and also to obtain other powers for extensions, etc.

(*e*) We propose to defer our final recommendation to the Corporation as to which alternative they should adopt—namely to purchase and work or to purchase and lease—until after the Corporation have obtained the necessary further Parliamentary powers.

A SUPPLEMENTAL REPORT.

In the light of the decision of the House of Lords' Committee on the Corporation's bill, Mr. Hamilton and Mr. Snell presented a supplemental report dated May 12. In this they say :

We have made a preliminary valuation of the "yellow" lines (that is, those purchasable on light railway terms), and, while we think it is inexpedient to disclose the figures at the present time, we can go so far as to say that the surplus annual profit given in our joint report of 1913 will not be materially affected or lessened.

A very careful and extended census was recently taken of the number of passengers riding upon the cars and motor 'buses throughout the different parts of the city. In the case of the tramways, these observations have enabled us to make a fairly accurate comparison of the earning powers of the yellow lines as compared with those of the red lines. The results of this census show that relatively the receipts per car-mile on the yellow lines are, as was expected, much lower than the receipts upon the red lines, and, in fact, these results show that the assumed receipts of 7d. per car-mile in Table 4 are generous. Upon the results thus obtained the valuation of the yellow lines has been based. In this a very considerable margin has been allowed, so that the financial result as shown in Table 5 of the original report may be accepted without hesitation as being certain of fulfilment.

In our joint report, Table 4, the then estimated receipts for 1913 were given at £237,440. Since the report was printed the published figures of the Tramways Company have been obtained, and we find that the receipts were actually £243,686, or £6,246 in excess of our original estimate. An analysis of the weekly receipts shows that about £2,500 of this amount was due to abnormal traffic during the Royal Agricultural Show. This goes to prove that our estimates have been reasonably prepared.

The report proceeds to emphasise some of the points made in the previous report. With regard to fares the new suggestion is made that an extension of the lengths of the penny stages, with each stage split up into two or three halfpenny stages, would result in an increase in the number of passengers carried, and therefore an increase in the total receipts, whilst being a great convenience and economy to the travelling public.

Since our joint report was prepared a further extended census of the 'bus traffic has been taken, with the result that the average revenue was found to be 8·89d. during the period of observation, as against the 6 64d. adopted in Table 4. The necessary corrections in Table 4, assuming that an average of 8·89d. per car-mile was maintained for the whole year, represent a deduction from receipts of £21,130, instead of £15,798, as shown, but this would not materially affect the result in Table 5 (viz., the annual surplus profit of £37,073), since the actual revenue obtained by the company, after making full allowance for abnormal traffic at or about the period of the Royal Agricultural Show, is found to be considerably in excess of our then estimate.

In Table 4 of the main report the receipts extracted from the company's returns have been taken by us to include both tramways and 'bus receipts—the latter amounting in 1915 to an estimated total of £15,798. There are indications, however, that these published receipts are for tramways only. If this be the case, then the financial results estimated by us in Table 5 will be, *pro tanto*, increased.

MR. McELROY'S REPORT.

Mr. J. M. McElroy in his report says that he has had the advantage of studying the joint report made by Messrs. Hamilton and Snell, and has made himself thoroughly familiar with all the facts and data relating to the present situation. He has also considered the developments which are likely to take place in the future. The conclusions he has arrived at are to the following effect.

(1) That in my view the Corporation should at once decide to acquire the tramways they have the option of purchasing in 1915 upon the advantageous terms of the Tramways Act, 1870. To do otherwise would be acting contrary to the best interests of the citizens of Bristol

(2) That they should also agree to purchase the remainder of the tramway undertaking on arbitration terms.

(3) That, speaking broadly, I concur in the conclusions arrived at by Messrs. Hamilton and Snell, and that the working of a tramway system like that of the city of Bristol should, if properly managed, result in a profit of 2s. per head of population, and a total profit of £36,000 per annum may reasonably be expected.

(4) That the carrying out of a progressive and enlightened policy as regards the provision of improved facilities will not only bring direct benefits to the travelling public of Bristol, but will also tend to improve the financial results from the operation of the tramway system. The following table shows the increase of the revenue per head of the population and the decrease in the average fare paid per passenger due to gradual reductions in the fares charged on the Manchester system during the past ten years, viz :

	Revenue per Head of the Population. £	Average Fare Paid per Passenger. Pence.		Revenue per Head of the Population. £	Average Fare Paid per Passenger. Pence.
1904 ..	0·75	1·2	1910 ..	0·86	1·17
1905 ..	0·77	1·19	1911 ..	0·88	1·16
1906 ..	0·81	1·19	1912 ..	0·92	1·16
1907 ..	0·84	1·19	1913 ..	0·94	1·12
1908 ..	0·86	1·21	1914 ..	0·96	1·07
1909 ..	0·87	1·19			

(5) That the present fares charged on the Bristol tramway system are exceptionally high. Cheaper fares - especially the extension of the distances which can be travelled for the penny fare—will tend to spread the population from the congested city districts to the more thinly-populated outer districts.

(6) That the statements to the effect that tramways as a means of city passenger transportation are likely to be "scrapped," and to be replaced by motor 'buses in the near future, are made only by those persons whose knowledge of the passenger transportation business is very limited. The statements are always supported by an illustration of what is happening in London, but the conditions prevailing in London are so widely different from those existing in the large provincial cities that no proper inferences can be drawn from them.

(7) In London the full development of the tramway system has been much retarded owing to local causes and influences.

(8) The exceptional conditions which exist in London gave an excellent opportunity to the motor 'bus as a competitor to the tramcar. The motor 'bus can furnish general transit facilities, *i.e.*, in the area where tramways are prohibited, and also in the area where they are not. In other words, the motor 'bus is able to supply the through travelling facilities which the tramcar in London cannot give. Hence the reason the motor 'bus has jumped into such popular favour there.

(9) I had the opportunity last year of closely studying on behalf of my own Corporation all the means of passenger transportation in the large cities in the United States, in Canada, on the Continent, and in the United Kingdom, and I have yet to find the evidence which will support the probability or the desirability of the "scrapping" of tramways and the substitution of motor 'buses as a means of city passenger transportation. The inability of the motor 'bus to handle the heavy traffic properly at the "rush" hours cannot be too strongly emphasised. This is where it fails when compared with the tramcar. At the same time the importance of the motor 'bus development should not be minimised Motor 'buses are destined to play an important part in the future as a means of surface transit for urban and suburban passenger transport ; they will supplement the tramway services in many directions, and particularly in the thinly-populated outlying districts where the extension of the tramway system is rendered financially impossible owing to the heavy outlay in permanent way construction.

(10) I have no hesitation in strongly recommending the Corporation to purchase and work the tramways undertaking themselves, knowing that they will be able to provide better and cheaper facilities than exist at the present time, and that substantial profits will accrue to the city.

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BIRMINGHAM TRAMWAY FARES.

A Report by Mr. Alfred Baker, General Manager, Birmingham Corporation Tramways.

At a meeting of the Birmingham Tramways Committee on November 18, 1913, the general manager was requested to consider and report as to the suggested provision of halfpenny fares on the Corporation tramways, and also as to the proposed extension of time for the issue of workmen's tickets. The report was presented to the Corporation by the Tramways Committee on May 19, when it was adopted by 50 votes to 35. The full text is given below:

HALFPENNY FARES AND WORKMEN'S TICKETS.

In accordance with your instructions, I beg to submit my report on the subject of (1) halfpenny fares and (2) extension of hours for issue of workmen's tickets. The committee have from time to time received requests from many sources for the institution of halfpenny fares, and much has been made of the fact that such fares exist in Glasgow and in some other towns, with, it is said, considerable profit to the operating authorities. I think it is well, in the first instance, to remind the committee that in 1904, when the Corporation commenced to operate its own tramways, the question of the fares to be charged on the Birmingham system was the subject of most careful and anxious consideration.

The matter did not press very urgently at that time for, it will be remembered, only one small piece of line, about 1¼ miles in length, viz., from Steelhouse Lane to the city boundry at Aston Brook, was in the possession of the Corporation, but it was felt desirable to lay down a general policy for future guidance when other tramways came into the hands of the Corporation. The policy then adopted was to give as long a ride as possible consistent with the financial stability of the undertaking for 1d. fare, and at the same time to give such facilities to the labouring classes as would enable them to live further away from their work in the centre of the city, and in better surroundings at the cheapest possible rates.

Section 38 (1) of the Birmingham Corporation Act, 1903, provides that—

> "The Corporation or their lessees at all times after the opening of the Corporation tramways for public traffic shall and they are hereby required to run a proper and sufficient service of carriages for artisans, mechanics, and daily labourers each way every morning and every evening (Sundays Christmas Day and Good Fridays always excepted) at such hours not being later than eight in the morning or earlier than five in the evening respectively as may be most convenient for such workmen going to and returning from their work at fares not exceeding one halfpenny for every mile or fraction of that distance. (The Corporation nevertheless not being required to take any fare less than one penny.) On Saturdays the Corporation or their lessees in lieu of running such carriages after five o'clock in the evening shall run the same at such hours between noon and two o'clock in the afternoon as may be most convenient for the said purpose."

The committee, however, felt that it was possible to give greater facilities to the labouring classes than was provided in the above section, and eventually it was decided to make every car leaving the various termini up to 8 o'clock a.m. a workman's car, and to issue on these cars return tickets enabling the owner to make a second journey, at any time, by any car, in either direction, at a charge in no case exceeding ½d. beyond the ordinary fare. This system has since obtained, but it was soon found that it was impossible to differentiate between artisans, mechanics, and daily labourers, and others travelling on workmen's cars, and of late years no effort has been made to do so, everybody being charged alike.

During the year 1912-13 no less than 15,528,896 workmen's return tickets were issued, and, as each ticket represents two journeys, it will be seen that upwards of 31,000,000 journeys were made at cheap workmen's rates. During the period 1904 to 1911 the tramways of the city had come into the hands of the Corporation in sections. In the latter year the last of the outstanding lines had passed into the possession of the Corporation. It was then found that certain anomalies and inconsistencies existed with regard to the fares and stages fixed by the company from whom some of the lines were purchased, as well as by some of the surrounding local authorities. The city had also extended its boundaries, and these circumstances rendered a revision of the stages imperative. It was felt desirable, therefore, that the whole subject should be gone into again, and a special sub-committee of the Tramways Committee was appointed for the purpose. As the result a scheme was prepared whereby the whole of the fares on the city tramways were made, as far as practicable, to synchronise, but in addition very considerable concessions were granted to the travelling public. The sub-committee's proposals were approved by the Tramways Committee, and by the City Council in February, 1912. The scheme was immediately put into operation, and the fares and stages then approved are in use to-day.

The following table shows the value of the concession referred to:

Ordinary Fares.

Scale in 1911.		New Scale in 1912.	
1d. stage	average 1 m. 1,016 yds.	1d. stage	average 2 m. 600 yds.
1½d. ,,	,, 2 m. 729 yds.	1½d. ,,	,, 3 m. 137 yds.
2d. ,,	,, 3 m. 664 yds.	2d. ,,	,, 4 m. 196 yds.

2½d., 3d., and 3½d. stages abandoned and merged into new 2d. stage.

Workmen's Return Fares.

1d. stage	average 1 m. 555 yds.	1d. stage	average 1 m. 626 yds.
1½d. ,,	,, 1 m. 1,592 yds.	1½d. ,,	,, 2 m. 600 yds.
2d. ,,	,, 2 m. 1,534 yds.	2d. ,,	,, 3 m. 137 yds.
2½d. ,,	,, 3 m. 1,164 yds.	2½d. ,,	,, 4 m. 196 yds.

3d. and 3½d. stages abandoned and merged into new 2½d. stage.

The effect of the new scale was to reduce the receipts from an average of 11·045d. to 10·492d. per car-mile. This new scale of fares, taking the cheap workmen's fares into consideration, is without doubt the cheapest in the country.

HALFPENNY STAGES.

Halfpenny stages were first instituted in Glasgow as far back as 1894. Originally the penny stage in Glasgow only averaged a little over a mile in length, and the Corporation adopted the plan of dividing the penny stage into two halfpenny stages of a little more than half a mile each. In course of time the penny stage was extended, until to-day it averages 2·28 miles. After various experiments by way of "two stage" tickets, etc., the Corporation decided in 1912 to carry passengers for half the lengthened penny stages at halfpenny fares. Glasgow has had a goodly number of imitators, and halfpenny stages are in vogue in some 20 towns in the United Kingdom. None of these towns, however, divide the 1d. stage as in Glasgow, but have adopted halfpenny stages approximating to half-mile lengths.

From the information I have gathered, there seems to be a general feeling that from the financial point of view halfpenny fares are a mistake. I set out at the end of this report the opinions of various towns on the subject. It may be asked: Why, if the halfpenny stage is profitable in Glasgow, it cannot be made equally successful and profitable in Birmingham? I think the answer is two-fold:

In the first place, Glasgow has no cheap fares for the labouring classes; and in the second place, Glasgow had until quite recently a greater density of population to the acre than any other city in the United Kingdom, as is shown by the following table:

	Acres.	Population to acreage.
*Glasgow	12,796	... 60·4
Liverpool	16,619	... 44·3
Manchester	21,645	... 33·0
Newcastle	8,453	... 31·55
Nottingham	10,935	... 23·76
Birmingham	43,537	... 19·18

The question of density of population as bearing upon the subject of halfpenny fares is extremely important. Glasgow, with its population of 60·4 to the acre, leaving out of consideration its huge floating population, must necessarily have an immense number of short-distance riders such as cannot possibly obtain where the population is spread over a wider area. It is apparent, therefore, that what may be possible in one town may mean financial ruin in another. If Glasgow conditions obtained in Birmingham, it would, in my opinion, be profitable to institute a system of halfpenny fares on identical lines, but Birmingham conditions are obviously very different. The proposal to institute halfpenny fares also reopens the question as to whether it is better to fix one scale of fares applicable to every passenger without any class distinction whatever, as in Glasgow, Liverpool, and some other cities, or to cater for workmen at less rates than ordinary fares, as is the policy in Birmingham. It is claimed in some quarters that one class of the community ought not to travel at cheap rates at the expense of another class, not necessarily able pay a higher rate. This, however, is a matter the committee must decide. I can only deal with the financial aspect.

As a matter of fact, the present system of workmen's fares is to some extent the halfpenny fare system. Thousands of persons travel every morning on the Birmingham cars for 1d., for which they are entitled to make the return journey free of charge. From the financial point of view, it might be profitable even in Birmingham to institute the halfpenny fare system of a limited character *if the workmen's return tickets were withdrawn*. Such an alteration would doubtless be received with great satisfaction by those of our passengers, 77 per cent. of the whole, who never travel by workmen's cars, and are thus unable to avail themselves of the cheaper rate of fares. Against this, however, it must not be forgotten that many hundreds of people have gone out into the suburbs to live, simply on account of the inducement of cheap workmen's fares. It would be no consolation to these if the workmen's facilities were withdrawn and halfpenny stages substituted. As a simple illustration: A workman living at King's Norton may at the

* Consequent upon the recent extension of the boundaries of Glasgow, the population has been reduced to 37·58 per acre.

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present time ride into the centre of Birmingham and back again, a distance of 9¾ miles, for 2½d. If the workmen's fares were withdrawn he would have to pay 4d., or an increase of 9d. per week. This man does not want to ride short distances, and halfpenny stages would be of no use to him. The result would be that he would have to remove back again to the centre of the city, and the policy of decentralisation, which I understand is much favoured by the Public Health and Housing Committee, would in consequence receive a serious setback.

The number of passengers carried at ordinary fares for the year ended March 31, 1913, was 86,422,910 at 1d., 9,794,363 at 1½d., 6,588,679 at 2d., and 603,283 children at 1d. Penny fares brought in £360,095, 1½d. fares £61,216, 2d. fares £54,905, and children's 1d. fares £2,513. The number of passengers carried double journeys at workmen's fares during the same period was 6,322,095 at 1½d., 5,755,893 at 1d., 2,471,874 at 2d., and 879,034 at 2½d. The figures clearly show what I have so often pointed out to the committee, viz., that the penny fare is the backbone of the tramway system in Birmingham, as in every other town, and that any innovation tending to decrease the number of penny fares would be almost certain to result in disaster.

It is necessary, therefore, to ascertain as nearly as may be how far the introduction of halfpenny stages would affect the penny fare. To this end I have recently had a census taken of the distances travelled by passengers on the penny stages on the various routes. The result shows that nearly 42 per cent. of our passengers rode less than half the length of the penny stage It is clear, therefore, that the penny fares would be reduced certainly by 42 per cent., but as a matter of fact the percentage of reduction would be much higher, inasmuch as by dividing the penny stage into halves a considerable number of persons living, say, within a quarter of a mile beyond the halfpenny stage would leave the cars and walk the remainder of the distance in order to save the extra halfpenny, or conversely would walk as much as a quarter of a mile to the halfpenny stage coming into town for the same purpose. I estimate that these would account for at least another 8 per cent., making a total reduction in the receipts of the department from penny fares of upwards of £90,000.

But it may be argued that by cheapening the fares a very large amount of new traffic would be induced. I have no doubt that this would be so, but I would point out that to recover the loss no less than 43,000,000 of additional passengers would be required Even if it were possible to obtain this additional traffic, it must not be forgotten that every car in the possession of the department, fit to run, is in service in the morning, and at certain hours are quite inadequate to deal with the present traffic. Any additional traffic induced by halfpenny fares would have to be met by the provision of additional rolling stock and car shed accommodation. As every modern tramcar such as is required in Birmingham costs upward of £1,000, it will be seen that a capital expenditure of anything up to £100,000 would be necessary to cope with the additional traffic, besides which there would be the usual operating expenses.

It may be suggested that halfpenny fares might be instituted during the slack periods of the day. The objection to this is that at the present time sufficient cars only are run to meet the traffic requirements, and any induced traffic from halfpenny fares would involve the running of additional cars, and these at unremunerative fares, which would only result in further loss. Another serious objection to halfpenny stages is the tremendous amount of additional work which would be put on the conductor to enable him to get in all his fares, particularly in the evening on the outward journey, when passengers are constantly dropping off the cars before the conductor has had time to collect all his fares. In consequence there would be great difficulty in checking the passengers—a difficulty which is as acute in Birmingham as in any other town. Many passengers consider it a smart piece of business to ride excess distances at the expense of the Corporation. They are offended when they are told it is cheating.

I am bound, therefore, to state my deliberate opinion that Birmingham cannot have both systems, viz., cheap workmen's tickets and halfpenny stages as well, if the financial stability of the undertaking is to be maintained, and, further, that to institute halfpenny stages on the Glasgow method would not only absorb all the present profits, but would render the undertaking a charge on the rates.

EXTENSION OF HOURS FOR WORKMEN'S CARS.

As already pointed out, under the present arrangement a person boarding a car up to 8 o'clock a.m. may travel at cheap workmen's rates. This means that a very large number of persons may be riding at cheap fares up to 8-30 a.m., as some of the runs into town occupy from 25 to 35 minutes. The present suggestion is that workmen's cars should be extended to 9 o'clock a.m. I would again remind the committee that the tramway traffic in Birmingham is peculiar to this city. In no other town is the peak load so high in the morning, nor does the traffic fall away to a greater extent during the middle of the day. This means that the department has to keep an enormous number of cars to deal with the peak load, a considerable proportion of which are idle during the remainder of the day. Diagrams presented with the report illustrate the point, and shows the position Birmingham occupies in this respect as compared with other large cities, etc.

To show the relationship between the workmen's fares and the ordinary fares, as affecting the revenue of the undertaking, I give the following information:

TICKETS ISSUED FOR YEAR ENDING MARCH 31, 1913.

Workmen's.					£	s.	d.
1d....	5,755,893,	or	37·06 per cent.,	value	23,982	17	9
1½d.	6,322,095,	,,	40·72 per cent.,	,,	39,513	1	10½
2d....	2,471,874,	,,	15·92 per cent.,	,,	20,598	19	0
2½d.	979,034,	,,	6·30 per cent.,	,,	10,198	5	5
Total	15,528,896				£94,293	4	0½

As each of these workmen's tickets represents two journeys, the number of passengers carried at workmen's fares amounted to 31,057,792. Average fare, ·73d. per passenger.

Ordinary.					£	s.	d.
1d. children ...	603,202,	or	·58 per cent.,	value	2,513	15	6
1d....	86,422,910,	,,	83·58 per cent.,	,,	360,095	9	2
1½d.	9,794,563,	,,	9·47 per cent.,	,,	61,216	0	4½
2d....	6,588,619.	,,	6·37 per cent.,	,,	54,905	3	2
Total... ...	103,409,374				£478,730	6	2½

Average fare, 1·11d. per passenger.
Total number of passengers—ordinary and workmen, 134,467,166.
Total receipts .. .. £573,023.
23 per cent. of full total were carried at workmen's rates.
77 per cent. of full total were carried at ordinary rates.
16½ per cent. of revenne was obtained from workmen's fares.
83½ per cent. of revenue was obtained from ordinary fares.

WORKMEN'S FARES A LOSS TO THE DEPARTMENT.

Every passenger travelling at workmen's fares on the Birmingham cars is carried at less than cost, as is shown by the following figures: Year ending March 31, 1913. Average cost per passenger—Working expenses ·66d., interest and sinking fund ·20d., depreciation ·09d., total ·95d. It will be seen in table "A" that each workman pays on the average ·73d. for his ride. The loss on each workman is, therefore, ·22d., which amounted during the year to no less a sum than £28,470. If there had been no workmen's fares, and every passenger had paid ordinary rates, the revenue of the department would have been increased by £53,500.

It remains to be considered: How much would this loss of £28,470 be increased by extending the workmen's tickets till 9 o'clock? I have gone carefully into this matter, and find that during the year 1912-1913 the passengers carried at ordinary fares between the hours of 8 and 9 a.m. amounted, in round figures, to 15 millions. Each of these passengers paid on an average 1·11d., and the receipts equalled £69,375. Had these passengers been carried at workmen's rates, viz., ·73d., the receipts would only have been £45,625. It is clearly shown, therefore, that the loss of revenue to the department by extending the workmen's fares for this one hour would be £23,750. If the issue of workmen's tickets were extended to 8-30 o'clock only, the estimated loss would be £11,875 per annum.

These figures are all based on the accounts of 1912-1913, but I think it is necessary to point out that the tendency year by year is for operating costs to increase. The expenses for the current year, owing to increased cost of wages and materials, will be considerably higher than last year. At the same time, there is a constant clamour for concessions, either by way of cheaper fares, or extended stages, or to certain classes of the community. The committee, therefore, will have to seriously consider how long it will be, unless a very definite attitude is taken, before the fractional profits per passenger are wiped out, and, instead of the undertaking continuing to be self-supporting, it will become a charge upon the rates.

Concession to the Blind.—West Ham Corporation have agreed to issue passes to necessitous blind persons—resident in the borough—enabling them to travel on East Ham tramway system, and any of the systems upon which inter-running takes place, free of charge, provided that the holder, when travelling, is accompanied by a guide, and that the guide pays the ordinary fare.

Thermit Demonstrations Abroad.—Messrs. Thermit, Limited, London, have taken over the entire control of the Thermit patents in South Africa and India, and have arranged to send their chief engineer on an extended tour in these countries with a view to the development of the business, especially as regards the welding of tramway rails. He will leave London about the middle of July, and the tour will extend over a period of about nine months. The company are also sending out one of their welders with the necessary plant to enable them to give a practical demonstration of the process on every system. The process has already been adopted on a number of systems, including Colombo, Singapore, East London (South Africa), etc.

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BOARD OF TRADE INQUIRIES.

Mishap at Facing Points in Dublin.

Colonel von Donop has reported on the derailing and overturning of a Dublin tramcar at the corner of Merrion Square on February 1, when 39 passengers notified the company of personal injuries sustained, and one, a woman, has since died. In his conclusion Colonel von Donop says: "There seems no reason to doubt that the facing points were, as stated by Motorman Downes, set for the curve instead of lying in their normal position, set for the straight road, and the reason for their having been in this position cannot be definitely ascertained. From the evidence, I think, it is probable that the speed of the car at the facing points was between five and six miles an hour. That speed by itself should hardly have been sufficient to have caused its derailment. It was, however, clearly in excess of that laid down in the company's regulations, and that was, undoubtedly, the reason why Downes was unable to conform to the rule that he should have ascertained that the points were lying the right way before running through them. Downes states that it was immediately after seeing that the points were lying the wrong way that he applied the magnetic brake, but that after doing so he had not time to apply the hand brake, so it is clear that it was immediately after the application of the magnetic brake that the derailment occurred. It seems probable, therefore, that this brake was not applied until the car had passed through the points, and had reached the curve. The sudden check caused by this application of the magnetic brake whilst the car was running at a slightly excessive speed round a sharp curve would, undoubtedly, have a tendency to cause the wheels to jump the rails to the outside of the curve, and this must, I consider, be regarded as the ultimate cause of this derailment. The accident must, therefore, be attributed, firstly, to the fact that the points, for some reason which cannot definitely be ascertained, were not lying in their normal position; secondly, to the fact that the speed of the car when approaching the points was too great to allow of the driver ascertaining their position and stopping the car before running through them; and, thirdly, to the sudden application of the brake when running round the curve at a rather high rate of speed. This is the first serious accident which has occurred at electrically-worked facing points. It shows that, with this arrangement, great care is required on the part of the driver to make sure of the position of his controller handle when he is running past the contacts, and also to approach the points at a sufficiently low rate of speed to enable him to stop his car if he finds that the points are lying in the wrong position. The company's attention might, I consider, be called to the necessity for supervision with regard to these matters."

The Manchester Accident.

On February 25, while a Manchester car from Slade Lane was turning the corner of High Street and Upper Brook Street, it left the metals, ran across the road on to the pavement, and overturned. Many of the 30 passengers sustained cuts from the broken windows, and one man had a leg broken. Colonel von Donop, Board of Trade inspector, investigated the circumstances of the accident at an inquiry at the Town Hall on February 27. Mr. Heath, the deputy town clerk, submitted that the accident occurred through the excessive speed at which the car was driven. There were about 40 people in the car. After it left the metals it ran 20 or 25 yards on the pavement, then turning over on its left side. This was the first accident on the system, Mr. Heath said, which had necessitated a Board of Trade inquiry, although Manchester had probably the largest tramway undertaking in the country, with 200 miles of track, and carrying 200,000,000 passengers annually. That showed, he thought, how efficiently the system was managed. The brakes of the car were absolutely efficient on February 25, as they still were, in spite of the rough usage the vehicle had gone through; the curve had been officially approved by the Board of Trade, and had no unusual features; and the track, which was level, had been maintained in perfect order. Mr. McElroy, the general manager, said the driver admitted to him quite candidly that the accident was due to careless driving, and that he ought not to have been travelling as fast as he was. The guard of the car and the time-keeper who was on duty at the spot said that the speed was excessive. The guard left the top of the car to attend to the trolley when and because he knew they were approaching the curve. Harry Law, the driver, said the morning was foggy, but he could see about 80 yards ahead. When about 60 yards from Upper Brook Street he began to wonder where he was. He was almost on the points when he saw them, and he turned off the power and applied the hand brake, but the speed seemed to increase, probably because of the greasy state of the rails. When on the points he put on the electric brake, but could not say whether it acted or not. He admitted that he was going too fast. The instructor constantly drilled into drivers an instruction that speed when entering facing points should not exceed four miles an hour. The instructor also gave evidence, and the inquiry was closed.

"KEYSTONE" SAND DRIER.

The importance of a satisfactory sand drier cannot be overrated for securing safe operation of tramways and railways. In the "Keystone" implement, the exterior view of which is as illustrated below, the Equipment and Engineering Company, of 2 and 3, Norfolk Street, Strand, London, are about to place on the market a drier that has been extensively adopted in Europe, the United States, Canada, and South America. Either hard or soft coal, wood, or gas can be used in the stove, and the drier will resist the greatest amount of heat, the iron used in its manufacture being of the same analysis as for locomotive grate bars. A 10-ton drier weighs approximately half a ton, a 5-ton drier 5 cwts., and a 3½-ton drier 3 cwts.

Two types of drier can be supplied. Each consists primarily of a heavy cast-iron heater surrounded by a sheet iron hopper, which rests upon a perforated ring. The difference in the types consists of the use of a grating between the heater and the hopper, thus giving an air space of 1½ in. between the two castings. This grating prevents the wet sand from coming into immediate contact with the heater, thereby largely increasing the drying capacity of the heater by preventing the baking of sand upon it and the consequent burning of the castings. When the grating is used the dry sand runs through the vertical openings into the hot air space and then out through the perforated ring on which it rests. In operation with either type of drier, the stove should be heated before the sand is placed in the hopper.

The amount of sand that will pass through the machine in a given time is variable, and depends largely upon the conditions under which it is used, the amount of moisture in the sand, and the intensity of the fire maintained. Clear sand only can be used, earth or clay would bake hard, and fail to run through the perforated ring.

FINANCIAL REPORTS AND MEETINGS.

Lima Light, Power, and Tramways Company.—A dividend has been declared at the rate of 4½ per cent. for the past year.

La Plata Electric Tramways Company.—A dividend of 3 per cent. on the preference shares has been paid, thus bringing arrears up to August 31, 1912. £1,000 has been placed to reserve, and £330 carried forward.

Willans and Robinson, Limited.—The net profits for the year 1913 were £8,782, after payment of debenture interest. A dividend of 10 per cent. is recommended on the ordinary shares, and £1,678 will be carried forward.

Yorkshire West Riding Electric Tramways, Limited.—The directors have decided to pay on July 1 an interim dividend of 3 per cent., being at the rate of 6 per cent. per annum, on account of the 6 per cent. cumulative preference shares.

Colombo Electric Tramways and Lighting Company, Limited.—Dividend of 10 per cent., free of tax, has been declared, for the year 1913, carrying forward £6,840. £20,000 has been transferred to general reserve and renewal fund.

Shanghai Electric Construction Company.—For 1913 the net profits were £34,726, and £1,974 was brought forward. A dividend of 7 per cent. is proposed, adding £10,000 to the renewal fund, writing £3,000 off preliminary expenses, and carrying forward £1,300.

Taunton Electric Traction Company.—Mr. G. J. Somerville, who presided at the annual meeting held at the London office, reported that the total receipts for 1913 were £2,776, and that a balance of £30 remained to be carried forward after meeting all expenses, debenture interest, and providing £100 for renewals.

British Electric Traction Company.—The directors, in their annual report, propose to add £50,000 to the reserve and to pay dividends of 6 per cent. on the 6 per cent. preference stock and 3½ per cent. on the 7 per cent. preference stock. A year ago 3 per cent. was paid on the 7 per cent. preference stock, and £40,000 was added to the reserve.

Electric Construction Company.—The net profits for the 10 months ended March 31 were £27,126 after providing for debenture interest, and £6,899 was brought forward. A dividend at the rate of 6 per cent. per annum is proposed on the ordinary shares, transferring £12,000 to the reserve fund, which will then amount to £58,000, and carrying forward £7,153.

(Continued on page 470.)

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Year Ended.	Electric Traction Inaugurated.	System.	Line open (single track). Mls. Chs.	Borrowing Powers.	Borrowing Powers Exercised.	Unexhausted Borrowing Powers.	Total Capital Expenditure.	Capital Expenditure per Mile of Single Track.	Loans Outstanding.	Loans Repaid and Sinking Fund.	Depreciation, Renewal and Reserve Funds.	Gross Receipts. Traffic.	Other.	Total.
Aberdeen ...	May 31, 1913	Dec., 1899	E.	27 66	350,000	..	...	350,590	12,599	192,660	157,929	143,468	79,125	1,041	80,166
Accrington ...	*Mar. 31, 1914	Aug., 1907	,,	10 53	181,925	133,875	48,050	134,734	12,636	113,870	20,864	16,581	29,843	350	30,193
Ashton-u-Lyne..	Mar. 25, 1913	Aug., 1902	...	8 15	130,070	108,099	21,971	108,099	13,203	79,589	28,510	2,150	22,206	285	22,491
Ayr	May 15, 1913	Sept., 1901	,,	7 49	...	...	...	85,445	11,224	78,933	18,044	14,918	15,626	670	16,296
Birmingham ...	*Mar. 31, 1914	Jan., 1904	,,	114 44	2,577,611	2,352,104	225,507	2,334,437	20,379	1,913,559	438,545	231,126	628,016	7,455	635,471
Blackburn ...	Mar. 25, 1913	Mar., 1899	,,	24 63	408,174	342,474	65,700	334,924	13,512	254,600	167,381	1,000	63,440	3,243	66,683
Blackpool ...	Mar. 31, 1913	June, 1899	,,	21 31	453,798	301,796	152,002	301,796	14,115	301,796	114,086	15,126	73,155	1,011	74,166
Bolton	Mar. 31, 1913	Dec., 1899	,,	47 17	552,208	551,019	1,189	559,107	11,842	338,439	162,580	55,901	135,149	1,313	136,462
Bradford ...	Mar. 31, 1913	July, 1898	,,	(h)103 69	1,269,568	982,398	287,170	1,032,566	9,653	607,928	388,335	89,072	280,758	18,345	299,103
Brighton	Mar. 31, 1913	Nov., 1901	,,	17 15	358,620	279,000	80,715	277,914	16,170	223,556	55,653	6,708	51,780	2,018	53,798
Burnley	Mar. 31, 1913	Dec., 1901	,,	22 13	388,052	339,125	48,927	231,601	10,450	179,498	56,652	48,212	79,641	249	79,890
Burton-on-Trent	Mar. 31, 1913	Aug., 1903	,,	9 60	108,632	104,562	4,070	106,225	10,895	50,583	53,979	8,966	14,383	1,304	15,687
Bury	*Mar. 31, 1914	June, 1903	,,	21 2 (b)13 21	407,800	284,745	123,055	286,989	13,650	255,455	49,013	(l)29,518	69,745	335	70,080
Chester	Mar. 25, 1913	April, 1903	,,	6 35	92,991	82,380	10,611	82,934	12,883	69,727	12,785	2,968	12,272	458	12,730
Chesterfield ...	Mar. 31, 1913	Dec., 1904	,,	5 8	95,000	70,500	24,500	69,575	13,642	58,510	11,990	5,051	12,220	474	12,694
Colchester ...	Mar. 31, 1913	July, 1904	,,	7 75	70,748	69,555	1,193	69,401	8,743	53,425	17,049	Nil.	10,281	477	10,758
Croydon	Mar. 31, 1913	June, 1906	,,	19 10	287,689	287,689	Nil	284,847	14,894	230,968	87,264	42,453	90,543	1,921	92,464
Darlington ...	Mar. 31, 1913	June, 1904	,,	8 71	107,500	76,263	31,237	76,322	8,587	56,888	19,434	5,726	11,842	334	12,176
Darwen	Mar. 31, 1913	Oct., 1900	,,	7 13	93,400	86,300	7,100	86,300	12,048	57,330	28,280	7,450	14,244	1,176	15,420
Derby	Mar. 31, 1913	July, 1904	E.	22 5	...	...	...	242,785	11,004	157,213	85,572	(a)4,486	E46,820	1,030	47,850
			H.		...	...	...	...	...	...	...	...	H 394	22	416
Doncaster ...	Mar. 31, 1913	June, 1902	E.	12 42	...	...	...	99,172	7,918	80,400	14,741	780	19,928	334	20,262
Dundee	May 15, 1913	July, 1900	,,	27 38	(f)	345,450	...	352,663	12,835	262,038	83,411	71,823	63,395	1,650	65,045
East Ham ...	Mar. 31, 1913	June, 1901	,,	14 52	190,643	190,242	401	191,583	13,307	148,515	58,075	5,097	57,050	610	57,660
Exeter	Mar. 31, 1913	April, 1905	,,	7 0	106,000	86,111	19,889	86,111	12,301	69,376	17,209	5,915	16,748	Nil	16,748
Gloucester ...	Mar 31, 1913	April, 1904	,,	15 0	191,000	144,243	46,757	147,692	9,846	111,051	16,816	750	16,177	1,168	17,345
Halifax	Mar. 31, 1913	June, 1898	,,	54 70	449,263	412,876	36,387	414,246	7,549	299,480	105,948	27,379	104,947	1,026	105,973
Ilford	Mar. 31, 1913	Mar., 1903	,,	11 28	149,633	149,633	Nil	149,500	13,171	103,912	39,721	5,611	24,361	2,407	26,768
Ilkeston	Mar. 31, 1913	May, 1905	,,	3 60	64,214	47,000	17,214	47,883	12,769	42,500	13,660	Nil	6,006	58	6,064
Ipswich	Mar. 31, 1913	Nov., 1903	,,	14 70	116,471	114,300	2,171	114,838	7,720	98,858	16,305	8,180	22,575	829	23,404
Keighley	Mar. 31, 1913	Oct., 1904	,,	6 9	50,934	47,328	3,606	47,328	7,745	32,468	16,961	942	8,845	313	9,158
Kilmarnock ...	May 15, 1913	Dec., 1904	,,	5 47	65,000	52,625	12,375	53,191	9,519	44,766	7,379	4,017	8,543	248	8,791
Kirkcaldy ...	May 15, 1913	Feb., 1903	,,	8 45	213,000	96,748	116,252	96,749	11,025	80,333	16,415	4,161	15,712	494	16,206
Lancaster ...	Mar. 31, 1913	Jan., 1903	,,	4 65	60,000	51,550	8,450	43,432	9,022	36,200	13,838	3,000	5,437	143	5,580
Leith	May 15, 1913	Aug., 1905	,,	17 73	275,000	237,300	37,700	236,155	14,572	186,500	50,800	514	34,664	1,030	35,694
Leyton	Mar. 31, 1913	Dec., 1906	,,	18 40	306,427	306,371	56	295,376	15,966	249,165	48,876	3,445	68,809	1,558	70,367
Lincoln	Mar. 31, 1913	Nov., 1905	S.	2 77	98,519	44,947	53,572	44,992	15,187	42,893	9,862	a) 1,600	6,717	128	6,845
Liverpool ...	Dec. 31, 1913	Nov., 1898	E.	119 0	...	...	...	2,021,706	17,014	1,177,384	1,031,771	428,318	677,881	13,018	690,899
Lowestoft ...	Sep. 30, 1913	July, 1903	,,	4 6	96,230	89,912	6,318	81,912	22,064	76,283	15,251	...	11,365	296	11,661
Maidstone ...	Mar. 31, 1913	July, 1904	,,	7 3	82,932	82,582	350	79,098	11,239	67,191	15,391	Nil.	9,761	535	10,296
Manchester ...	*Mar. 31, 1914	June, 1901	,,	202 48	2,358,606	2,117,411	141,195	2,130,904	10,518	1,616,131	491,410	478,381	911,223	14,087	925,310
Nelson	Mar. 31, 1913	Feb., 1903	,,	3 69	38,000	37,832	168	37,832	9,795	30,118	7,714	...	10,240	51	10,291
Newport (Mon.)	Mar. 31, 1913	April, 1903	,,	14 28	219,250	196,250	23,000	193,191	13,463	164,763	31,487	9,075	37,555	995	38,550
Nottingham ...	Mar. 31, 1913	Jan., 1901	,,	37 40	730,300	725,945	4,355	638,005	17,479	426,818	217,041	64,242	161,746	2,404	167,160
Oldham	Mar. 25, 1913	May, 1902	,,	28 6 (b) 8 31	516,923	440,204	76,719	442,174	15,750	320,725	118,217	2,135	108,003	2,574	110,577
Perth	May 15, 1913	Nov., 1905	,,	6 60	90,000	78,350	11,650	78,629	11,649	63,340	15,489	1,673	8,761	509	9,270
Plymouth ...	Mar. 31, 1913	Sept., 1899	,,	15 0	...	189,512	...	219,417	14,628	90,925	37,826	17,550	37,925	1,123	39,048
Pontypridd ...	Mar. 31, 1913	Mar., 1905	,,	8 48	136,019	135,919	100	137,148	15,946	109,757	26,052	Nil	21,580	313	21,893
Rawtenstall ...	Mar. 31, 1913	May, 1909	,,	15 71	193,290	181,526	11,764	181,776	14,442	162,451	19,075	3,177	25,410	1,126	26,536
Rochdale ...	Mar. 31, 1913	May, 1902	,,	(i) 40 2	356,991	347,782	9,209	353,066	15,401	347,782	83,475	5,904	80,058	287	80,345
Rotherham ...	Mar. 31, 1913	Jan., 1903	,,	12 2	...	...	...	162,504	13,542	144,850	27,250	21,203	40,232	26	40,258
			RT	...	...	...	...	...	...	...	...	...	2,457	Nil	2,457
Salford	Mar. 31, 1913	Oct., 1901	E.	75 64	1,050,666	723,669	326,997	723,672	9,547	536,791	258,977	45,699	260,365	486	260,851
Southampton ...	Mar. 31, 1913	Jan., 1900	,,	18 35	276,755	252,164	24,591	255,154	13,974	170,637	79,732	12,595	64,186	2,348	66,534
Southend-on-Sea	Mar. 31, 1913	July, 1901	,,	11 49	130,000	129,961	39	143,808	12,384	116,940	12,784	3,045	34,453	465	34,918
Southport ...	Mar. 31 1913	July, 1900	,,	(d) 10 63	292,000	196,500	95,500	118,708	11,004	153,530	42,970	442	16,928	386	17,314
South Shields ...	Mar. 31, 1913	Mar., 1906	,,	10 21	251,883	174,936	76,947	172,476	16,806	150,228	30,818	20,838	33,654	498	34,152
Staly'ge, H., M., D.	Mar 31 1913	May, 1904	,,	27 57	325,270	274,990	44,280	279,778	10,096	224,700	56,290	500	34,961	677	35,638
Stockport ...	Mar. 31, 1913	Aug., 1901	,,	27 5	305,028	217,804	87,224	251,508	9,145	167,300	67,199	33,552	(n)62,979	1,198	64,178
Sunderland ...	Mar. 31, 1913	Aug., 1900	,,	20 28	308,699	303,211	5,488	305,254	14,999	182,318	111,943	31,883	68,507	364	68,871
Wallasey ...	Mar. 31, 1913	Mar., 1902	,,	19 69	198,167	195,290	2,877	215,424	10,846	167,924	58,733	11,927	57,458	564	58,022
Walsall	Dec. 31, 1913	Dec., 1902	,,	19 44	188,145	188,100	45	183,351	9,378	159,561	58,366	33,873	32,991	682	33,673
Walthamstow ...	Mar 31, 1913	June, 1905	,,	12 42	198,000	180,000	18,000	173,241	13,851	160,982	19,018	4,687	37,191	785	37,976
Warrington ...	*Mar. 31, 1914	April, 1902	,,	9 52	103,674	102,896	778	102,128	10,583	70,476	32,422	10,000	23,232	521	23,753
West Ham ...	Mar. 31, 1913	Feb., 1904	,,	30 4	563,478	551,463	12,015	556,878	18,532	539,650	90,402	40,352	137,766	676	138,442
Wigan	Mar. 31, 1913	April, 1901	,,	(k) 34 42	...	...	...	...	...	...	...	...	71,268	1,515	72,783
Wolverhampton	Mar. 31, 1913	April, 1902	S.	21 40	279,733	265,616	14,117	278,615	12,959	217,882	47,734	50,220	53,963	797	54,760
Yarmouth (Gt.)...	Mar. 31, 1913	June, 1902	E.	14 32	144,500	119,750	24,750	121,899	8,465	111,450	22,737	6,070	23,625	508	24,133

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast	Mar. 31, 1913	Nov., 1905	E.	98 54	1,567,674	1,386,232	181,442	1,389,713	14,037	1,381,200	144,342	117,769	250,589	3,788	254,377
Bexley	Mar. 31, 1913	Oct., 1903	,,	6 42	99,942	97,387	2,555	96,927	14,912	76,492	20,895	959	13,654	(a)1,542	15,196
Birkenhead	Mar. 31, 1913	Feb., 1901	,,	24 7	375,848	364,854	10,994	366,610	15,220	247,012	117,863	18,070	61,202	4,365	65,567
Bournemouth ...	Mar. 31, 1913	July, 1902	,,	(e) 29 62	449,027	...	...	435,788	19,500	221,797	134,815	13,733	95,695	317	96,012
Cardiff	Mar. 31, 1913	May, 1902	,,	31 66	818,573	787,292	19,564	783,270	24,612	542,488	244,803	92,968	129,265	21,361	150,626
Coventry ...	Mar. 31 1913	Jan., 1912	,,	15 40	220,538	216,436	4,102	211,298	13,632	216,436	3,287	2,876	38,996	156	39,152
Glasgow	May 31, 1913	Oct., 1898	,,	193 47 (b) 2 52	3,714,266	3,553,584	160,682	3,694,143	18,595	2,479,408	1,074,177	2,079,645	1,007,653	3,891	1,011,544
Huddersfield ...	Mar. 31, 1913	Feb., 1901	,,	46 0	646,284	407,142	239,142	417,408	9,074	255,177	161,349	19,132	106,586	3,123	109,709
Hull	Mar. 31, 1913	July, 1899	,,	30 44	677,673	541,871	135,802	542,371	17,753	527,641	147,925	125,407	157,048	1,393	158,441
Leeds	*Mar. 31, 1914	Aug., 1897	,,	114 5	1,701,455	1,626,422	75,033	1,571,196	13,775	1,286,916	534,631	4,801	423,516	3,939	427,455
Leicester...	Dec. 31, 1913	May, 1904	,,	37 0	929,120	727,405	201,715	739,982	19,999	602,478	129,807	100,000	147,458	17,059	164,517
London	Mar. 31, 1913	...	H.	15 70									37,544	879	38,423
		May, 1903	C.E	272 40	(c)	(c)	(c)	12,268,035	...	11,734,060	2,515,747	906,796	2,143,559	69,748	2,213,307
N'castle-on-Tyne	Mar. 31, 1913	Dec., 1901	E.	61 0	1,522,010	1,251,047	270,963	1,234,080	20,230	939,120	383,921	119,407	228,091	10,114	238,205
Northampton ...	Mar. 31, 1913	July, 1904	,,	9 13	239,800	127,255	112,545	135,481	14,786	91,176	36,078	10,499	27,250	899	28,149
Portsmouth ...	Mar. 31, 1913	Sep., 1901	,,	30 66	662,280	698,319	..	712,792	23,118	647,489	234,258	94,934	108,087	1,745	109,832
Preston	Mar. 31, 1913	June, 1904	,,	17 16	224,102	187,270	36,832	187,269	10,888	119,790	42,091	36,841	42,964	306	43,270
Reading	Mar. 31, 1913	July, 1903	,,	13 14	235,000	234,000	1,000	229,372	17,409	169,642	59,896	17,831	32,984	1,030	34,014
Sheffield	Mar. 25, 1913	Sep., 1899	,,	77 67	1,727,596	1,413,980	313,616	1,411,959	18,140	1,067,897	418,292	27,521	358,656	3,189	361,845
Wellington, N.Z.	Mar. 31, 1913	...	,,	30 7	496,423	496,423	Nil	606,771	20,165	496,423	39,486	109,066	149,446	826	150,272

C—Electric conduit system. F.—Electric trolley system. H—Horse lines RT—Railless trolley system. S—Surface contact system.
(a) Accident insurance fund. (b) Additional lines leased and worked. (c) Conferred by Annual Money Act, which limits amount for each financial year. Powers not exercised are lapsed. (d) Not including 8 m. 78 ch. leased lines. (f) Unlimited. (h) Includes 1½ miles railless trolley route. (i) 17 mi. 8 chn. single track leased. (k) Not including 10 miles 3 chains single track lines leased. (l) Including Insurance. (n) Includes £114 trackless cars. (o) Includes £1,310 through-running contributions.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Working Expenses.					Gross Profit on Working.	Additions to Gross Profit.	Deductions from Gross Profit.						Net Surplus + or Deficit −
	Traffic.	General.	Repairs & Maintenance.	Power.	Total.			Interest.	Sinking Fund.	Income Tax.	Depreciation & Renewal.	Sundries.	Total.	
Aberdeen	20,710	9,404	5,954	7,138	43,206	36,960	472	6,839	4,661	...	13,407	...	24,907	+ 12,525
Accrington	7,570	2,792	2,268	4,880	17,510	12,683	...	3,969	3,783	198	3,100	65	11,115	+ 1,568
Ashton-under-Lyne	4,840	1,754	2,118	3,278	11,990	10,501	...	2,727	3,651	485	500	371	7,734	+ 2,767
Ayr	3,486	1,964	1,604	1,989	9,043	7,253	...	1,972	1,943	122	2,041	...	6,078	+ 1,175
Birmingham	183,119	59,947	88,698	113,743	445,507	189,964	8,487	68,478	53,804	...	...	197	122,479	+ 75,972
Blackburn	14,863	4,262	12,392	10,999	42,516	24,167	110	5,292	14,909	206	...	...	20,407	+ 3,870
Blackpool	15,992	5,132	9,286	9,272	39,682	34,484	...	(h)9,184	6,969	...	8,000	...	24,153	+ 10,331
Bolton	29,821	8,646	15,984	19,767	74,213	62,244	1,114	(h)11,189	17,197	1,095	18,715	219	48,415	+ 14,943
Bradford	83,763	24,458	46,061	46,271	200,553	98,550	4,045	20,735	31,926	3,653	32,921	4,360	93,595	+ 9,000
Brighton	14,309	4,028	12,853	8,316	39,506	14,292	27	7,800	5,560	...	27	...	13,360	+ 932
Burnley	18,718	5,306	9,525	15,881	49,430	30,460	...	5,662	6,491	893	...	(f)2,873	15,919	+ 14,541
Burton-on-Trent	5,111	1,322	2,903	2,998	12,334	3,353	...	1,406	1,418	...	1,500	...	4,324	− 971
Bury	15,735	5,416	7,011	7,684	35,846	34,234	151	7,904	4,895	462	3,124	(w)12,000	28,385	+ 6,000
Chester	3,349	1,574	878	2,203	8,004	4,726	93	(h)2,761	1,018	...	1,040	...	4,819	...
Chesterfield	2,739	1,230	1,912	2,110	7,991	4,703	253	2,287	1,849	...	...	...	4,136	+ 820
Colchester	2,825	1,189	1,771	2,508	8,293	2,465	48	(h) 2,159	2,319	...	...	...	4,478	− 1,965
Croydon	29,571	6,806	13,300	16,541	66,218	26,246	907	7,994	7,428	1,145	...	...	16,567	+ 10,586
Darlington	4,192	754	1,912	1,945	8,811	3,365	102	2,010	1,966	105	404	59	4,544	− 1,077
Darwen	3,594	831	3,096	2,395	9,916	5,504	141	2,298	2,191	...	1,050	...	5,539	+ 106
Derby	E 16,388 H 631	2,621 ...	4,768 73	8,200 ...	31,977 704	15,873 def. 288	547	6,388	3,363	...	310	(l) 300	10,361	+ 6,059
Doncaster	4,364	1,156	4,698	3,561	13,779	6,483	84	2,876	1,737	...	664	...	5,277	+ 1,290
Dundee	16,477	5,607	7,122	10,216	39,422	25,623	...	8,606	6,020	233	9,254	...	24,113	+ 1,510
East Ham	17,280	6,330	11,722	10,072	45,404	12,256	...	(h) 5,806	6,725	...	...	454	12,985	− 729
Exeter	4,511	1,175	1,311	3,499	10,496	6,252	...	(h) 2,347	1,814	48	...	...	4,209	+ 2,043
Gloucester	6,891	1,687	3,290	1,914	13,782	3,563	...	(h)4,502	2,772	...	750	...	8,024	− 4,461
Halifax	27,116	8,306	15,263	18,976	69,661	36,312	51	10,159	10,562	...	6,701	1,760	29,182	+ 7,181
Ilford	9,482	2,424	4,116	4,279	20,301	6,467	557	4,894	4,146	...	...	...	9,040	− 2,016
Ilkeston	2,057	614	2,497	1,308	6,476	def.412	524	1,748	1,694	...	...	(i) 412	3,854	− 3,330
Ipswich	8,072	1,827	4,015	3,502	17,416	5,988	...	(h) 3,642	2,078	...	...	...	5,720	+ 268
Keighley	2,692	768	899	1,612	5,971	3,187	179	1,116	1,881	...	...	(m) 369	3,366	...
Kilmarnock	2,921	599	800	1,633	5,953	2,838	...	(h)1,623	1,233	3	1,160	28	4,047	− 1,209
Kirkcaldy	4,728	1,158	1,525	2,636	10,047	6,159	...	2,660	1,608	...	410	110	4,788	+ 1,370
Lancaster	2,237	474	872	1,621	5,204	376	80	1,243	1,467	...	...	...	2,710	− 2,254
Leith	9,204	2,631	4,213	3,468	19,516	16,178	272	(h)6,343	7,750	13	...	70	14,176	+ 2,274
Leyton	(p)21,929	6,544	11,592	12,875	52,940	17,427	133	10,048	8,064	...	...	228	18,340	− 780
Lincoln	1,478	625	989	925	4,017	2,828	153	1,529	1,071	...	...	...	2,600	+ 381
Liverpool	180,226	61,361	84,026	121,185	446,798	244,101	24,220	48,971	60,318	...	(d)54,163	e) 4,869	168,321	+100,000
Lowestoft	3,320	743	1,579	2,685	8,327	3,334	..	(h) 2,499	2,031	...	...	...	4,530	− 1,196
Maidstone	2,405	1,018	1,469	1,903	6,795	3,501	58	2,687	2,243	...	...	32	4,962	− 1,403
Manchester	276,663	89,420	89,649	129,492	585,224	340,086	13,594	(h)55,729	54,599	9,418	97,219	33,625	250,590	+103,090
Nelson	2,425	677	1,320	2,006	6,428	3,863	...	1,008	966	...	...	...	1,974	+ 1,899
Newport (Mon.)	10,254	4,009	10,364	7,044	31,671	6,879	808	5,817	4,197	...	...	...	10,014	− 2,327
Nottingham	43,601	15,142	18,684	30,847	108,274	58,886	...	14,349	19,762	...	...	...	34,111	+ 24,775
Oldham	25,759	7,792	18,416	21,470	73,437	37,140	1,474	15,796	11,822	1,099	...	(g) 7,762	36,479	+ 2,135
Perth	3,182	698	418	1,252	5,550	3,720	50	1,523	1,632	3	612	...	3,770	...
Plymouth	8,031	4,161	4,322	7,905	24,419	14,629	1,257	4,793	3,932	...	4,465	...	13,190	+ 2,696
Pontypridd	5,017	1,395	5,476	3,196	15,084	6,809	1,754	(h)4,009	4,160	...	...	39	8,208	+ 355
Rawtenstall	5,415	2,133	3,445	4,113	15,106	11,430	(q) 1,612	5,947	6,113	...	...	...	12,060	+ 982
Rochdale	18,354	4,363	8,535	10,746	41,998	38,347	7,594	11,454	9,594	700	1,382	(x)9,483	32,613	+ 13,328
Rotherham	E 9,212 RT 557	2,778 273	5,711 633	8,591 369	26,292 1,832	13,966 625	...	4,918 73	3,261 ...	...	5,037 ...	...	13,216 73	+ 750 + 552
Salford	73,745	17,785	22,183	47,371	161,084	99,767	5,659	(h)18,749	21,912	2,522	12,867	27,376	83,426	+ 22,000
Southampton	19,408	5,269	10,092	12,280	47,049	19,485	9,151	7,290	7,241	565	5,000	1,422	21,518	+ 7,118
Southend-on-Sea	8,046	2,260	3,534	6,187	20,027	14,891	4,228	(h) 3,834	1,753	...	4,017	...	9,605	+ 9,514
Southport	4,428	2,140	2,662	3,263	12,493	4,821	6,362	6,513	5,017	...	1,977	628	14,135	− 2,952
South Shields	7,929	3,263	2,659	5,370	19,221	14,931	313	(h)5,488	3,438	...	...	...	8,926	+ 6,318
Staly'dge,H., M., D.	12,148	4,018	6,273	6,445	28,884	6,754	...	(h) 7,711	7,308	...	327	532	15,878	− 9,124
Stockport	13,876	3,520	6,852	5,929	30,179	33,998	1,197	5,639	8,701	1,053	2,698	5,602	23,696	+ 11,500
Sunderland	18,431	4,552	4,670	11,268	38,921	29,950	252	(h) 7,228	10,366	476	7,132	...	25,202	+ 5,000
Wallasey	17,249	4,326	5,695	10,660	37,930	20,092	316	5,522	4,559	...	634	...	10,715	+ 9,693
Walsall	8,019	3,201	4,678	5,710	21,608	12,065	1,371	5,191	3,439	458	1,868	...	10,956	+ 2,480
Walthamstow	14,731	2,646	6,717	8,175	32,269	5,707	210	(h) 6,085	2,698	...	...	...	8,783	− 2,866
Warrington	5,999	1,834	3,973	3,411	15,217	8,536	537	2,481	3,353	...	...	...	5,834	+ 3,239
West Ham	51,254	11,253	26,921	19,386	108,814	29,628	508	19,511	12,369	685	...	959	33,524	— 3,388
Wigan	...	...	...	...	41,318	31,465	...	13,859	12,391	...	...	3,781	...	...
Wolverhampton	12,259	4,157	7,334	6,778	30,528	24,232	(x) 1,131	7,788	5,146	100	4,915	(a)3,637	21,586	+ 3,777
Yarmouth (Gt.)	7,443	1,867	2,634	4,388	16,332	7,801	95	(h) 4,094	2,740	...	...	...	6,834	+ 1,062

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast	73,836	13,642	32,519	23,887	143,884	110,492	1,363	45,900	24,541	2,023	13,000	1,628	87,092	+ 24,763
Bexley	3,455	1,011	2,332	1,167	(s) 10,118	5,078	40	2,850	2,410	...	242	...	5,502	− 384
Birkenhead	16,099	4,011	10,380	9,371	39,861	25,706	86	(h)11,537	9,501	269	4,302	183	25,792	...
Bournemouth	22,307	6,912	9,107	13,967	52,293	43,719	723	10,733	15,371	...	...	(c) 8,017	34,121	+ 10,321
Cardiff	37,582	(c)11,176	15,351	20,184	84,293	66,333	1,732	24,138	22,801	800	6,946	...	54,685	+ 13,380
Coventry	10,112	4,288	6,952	2,765	24,117	15,035	2,950	(t)10,379	(t)3,287	...	(t)916	(t)342	(t)14,924	+(t)3,061
Glasgow	305,400	122,812	142,988	48,147	619,347	392,197	58,631	81,774	97,077	13,388	215,757	9,829	417,825	+ 33,003
Huddersfield	26,892	6,064	22,638	9,933	65,527	44,182	61	(h)11,749	10,904	1,630	...	...	24,283	+ 19,960
Hull	47,495	12,212	42,005	11,245	112,957	45,484	1,500	16,730	12,201	1,500	(u)3,118	...	33,549	+ 13,435
Leeds	113,819	41,144	41,020	30,399	226,382	201,073	8,354	44,961	53,914	5,344	31,576	3,627	139,422	+ 70,005
Leicester	54,257	10,405	21,566	23,887	110,115	54,402	3,763	23,541	12,453	2,122	7,636	2,413	48,165	+ 10,000
London	H 19,064 E 742,157	4,670 (r) 185,634	6,592 312,395	(m)22,122 220,042	52,448 1,460,228	def.14,025 753,079	... 33,397	342,645	388,042	28,188	497	(t)27,104	786,476	...
N'castle-on-Tyne	64,493	18,675	25,944	19,908	129,020	109,185	3,966	30,431	39,556	3,179	...	6,796	79,962	+ 33,189
Northampton	7,254	3,080	2,489	3,563	16,386	11,763	279	3,481	4,312	323	...	(b)1,226	9,342	+ 2,700
Portsmouth	28,918	10,200	7,877	5,231	52,226	57,606	8,831	20,875	17,462	964	8,412	350	48,063	+ 18,374
Preston	10,781	4,592	6,263	2,429	24,065	19,205	...	3,933	4,891	...	3,649	1,358	13,831	+ 5,374
Reading	8,837	3,702	3,648	3,358	19,545	14,469	...	6,714	4,662	291	...	...	11,667	+ 2,802
Sheffield	113,235	22,312	43,656	28,487	207,690	154,155	3,057	35,616	40,663	3,786	30,187	213	110,465	+ 46,748
Wellington, N.Z.	56,296	7,242	21,330	16,260	101,128	49,144	2,664	19,961	4,778	...	14,068	4,702	43,509	+ 8,299

(a) Includes £4,393 loss on motor omnibuses. (b) Includes £500 loss on omnibus account. (c) Includes £1,611 insurance fund. (d) Includes reserve.
(e) Includes rents for leased lines. (f) £2,061 rent of leased lines. (g) Includes rents of lines and deficit 1912. (h) Including income tax. (i) Loss on working.
(k) Includes rents of lines. (l) Including loss on horse traction. (m) Horsing expenses. (n) Transferred to motor omnibus capital account.
(p) Includes £396 horse account. (q) Aid from rates £1,500. (r) Including special charges, £5,911. (s) Includes £2,153 through-running contributions to L.C.C.
(t) Amounts for 15 months. (u) District fund widening streets. (w) Amount apportioned to leased lines. (x) Includes £306 profit on motor char-a-banc.
(z) Includes £6,469 rent of leased lines. : £2,950 profit from 3 months' working.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Appropriation of Net Surplus.			Receipts per Car Mile.		Operating Expenses per Car Mile.					Percentage of Operating Expenses to Total Revenue.	Average Operating Expenses per Car Mile (excludi'g Power Cost).	Board of Trade Units.		
	Carried Forward.	Reserve.	Contribution to Rates or Municip'l Funds.	Average Total per Car Mile.	Average Traffic per Car Mile.	Traffic.	General.	Repairs and Maintenance.	Power. (Price paid)	Total.			Units.	Cost per Unit.	Units used per car mile.
				d.	d.	d.	d.	d.	d.	d.	%	d.		d.	
Aberdeen ...	...	12,525	...	11·06	10·92	2·859	1·298	·822	·985	5·964	53·89	4·979	2,110,964	·81	1·21
Accrington ...	...	...	1,568	12·64	12·49	3·17	1·18	·94	2·04	7·33	57·99	5·29	949,054	1·23	1·65
Ashton-u-Lyne ...	...	...	1,000	11·682	11·534	2·514	·911	1·100	1·703	6·228	53·31	4·525	622,183	1·25	1·346
Ayr	...	1,175	...	10·13	9·713	2·16	1·23	·99	1·24	5·62	55	4·35	378,570	1·26	·98
Birmingham ...	44,972	31,000	...	10·689	10·564	3·080	1·009	1·492	1·913	7·494	70	5·581	24,257,823	1·125	1·70
Blackburn ...	3,870	...	...	14·02	13·34	3·12	·90	2·61	2·31	8·94	56·84	6·63	2,030,535	1·3	1·81
Blackpool ...	...	2,667	7,664	16·93	16·71	3·64	1·17	2·12	2·12	9·05	53·50	6·95	1,400,209	1·587	1·33
Bolton	443	...	14,500	11·558	11·447	2·525	·733	1·354	1·674	6·286	54·915	4·612	4,315,448	1·1	1·52
Bradford	...	...	9,000	12·021	11·314	3·366	·983	1·859	1·860	8·068	67·051	5·687	11,126,989	1	1·863
Brighton	932	...	...	11·545	11·112	3·071	·864	2·758	1·785	8·478	73·43	6·693	1,663,126	1·2	1·49
Burnley	...	5,791	8,750	13·226	13·185	3·098	·878	1·577	2·630	8·183	61·85	5·55	3,079,155	1·214	2·11
Burton-on-Trent ...	...	...	...	8·61	7·90	2·81	·73	1·45	1·42	6·41	78·7	4·99	515,622	1·39	1·01
Bury	...	(k)1,000	5,000	10·38	10·26	2·315	·769	1·213	1·252	5·549	50·44	4·297	2,037,620	1	1·252
Chester	...	...	...	8·81	8·50	2·32	1·09	·61	1·52	5·54	63	4·02	385,132	1·33	1·11
Chesterfield ...	...	820	...	10·51	10·12	2·27	1·02	1·58	1·75	6·62	62·9	4·87	405,096	1·25	1·39
Colchester ...	...	...	...	7·98	7·627	2·096	·882	1·313	1·86	6·151	76·74	4·291	401,208	1·5	1·24
Croydon	...	7,586	3,000	8·381	8·207	2·763	·637	1·224	1·499	6·123	70·91	4·497	2,484,993	1·604	·938
Darlington ...	...	...	...	7·651	7·441	2·633	·480	1·202	1·222	5·537	72·36	4·315	466,784	1	1·222
Darwen	106	...	...	14·218	14·204	3·771	·783	2·833	2·396	9·783	64·30	7·387	...	...	...
Derby	6,059	...	...	E 9·884	9·671	3·385	·541	·985	1·694	6·605	66·8	4·911	1,357,232	1·48	1·168
				H. 5·649	5·347	8·564	...	·994	...	9·558	169·4	...	...	...	...
Doncaster ...	...	1,290	...	9·41	9·25	2·03	·54	2·18	1·65	6·40	69·1	4·75	683,651	1·25	1·32
Dundee	...	10	1,500	11·480	11·189	2·908	·989	1·257	1·803	6·957	60·6	5·154	2,451,897	1	1·803
East Ham ...	...	...	...	10·06	9·95	3·02	1·10	2·04	1·76	7·92	78·8	6·16	2,139,401	1·125	1·55
Exeter	...	2,043	...	9·272	9·272	2·498	·650	·726	1·937	5·811	62·67	3·874	516,793	1·625	1·192
Gloucester ...	...	...	...	6·618	6·173	2·630	·644	1·255	·730	5·259	79	4·529	480,442	1	·73
Halifax	...	...	7,181	11·816	11·702	3·023	·926	1·702	2·116	7·767	65	5·65	3,900,902	1·125	1·81
Ilford	...	...	...	7·616	7·464	2·698	·689	1·171	1·218	5·776	76·4	4·558	960,866	1·07	1·098
Ilkeston	...	...	...	6·727	6·661	2·281	·681	2·77	1·451	7·183	106·79	5·732	326,198	1	1·50
Ipswich	268	...	...	8·408	8·110	2·900	·657	1·442	1·258	6·257	74·41	4·999	672,411	1·25	1·007
Keighley	...	...	...	9·064	8·754	2·664	·761	·890	1·595	5·910	65	4·315	254,636	1·5	1·06
Kilmarnock ...	...	...	...	7·09	6·89	2·357	·482	·646	1·317	4·802	66·3	3·487	313,550	1·25	1·06
Kirkcaldy ...	1,370	...	...	8·22	7·97	2·398	·587	·774	1·337	5·096	63·95	3·75	632,581	1	1·337
Lancaster ...	...	...	...	7·92	7·61	3·130	·664	1·221	2·269	7·284	91	5·015	228,902	1·7	1·33
Leith	2,274	...	...	9·07	8·81	2·34	·67	1·07	·88	4·96	54·67	4·08	899,191	·92	·95
Leyton	...	...	...	9·368	9·161	(c) 2·920	·671	1·543	1·714	7·048	75·092	5·374	2,911,345	1·037	1·615
Lincoln	381	...	...	10·24	10·05	2·21	·94	1·47	1·38	6·00	58·7	4·62	183,807	1·25	1·107
Liverpool ...	...	...	100,000	12·34	12·10	3·217	1·096	1·500	2·164	7·977	63·2	5·813	23,928,396	1·138	1·78
Lowestoft ...	...	...	...	8·5	8·3	2·50	·56	1·2	2·0	6·26	71·58	4·26	368,242	1·78	1·1
Maidstone ...	...	...	...	8·36	7·93	1·96	·82	1·19	1·55	5·52	69·58	3·97	365,309	1·25	1·236
Manchester ...	...	...	103,090	11·410	11·236	3·411	1·103	1·105	1·597	7·216	63·25	5·619	30,035,057	1·034	1·543
Nelson	1,889	...	...	12·29	12·23	2·89	·81	1·58	2·39	7·67	62	5·28	240,804	2	1·2
Newport (Mon.) ...	...	...	...	9·557	9·310	2·542	·994	1·570	1·746	7·852	82·26	6·106	1,239,245	1·28	1·28
Nottingham ...	...	5,775	19,000	11·50	11·34	3·00	1·05	1·29	2·11	7·45	64·19	5·39	5,761,096	1·25	1·65
Oldham	...	2,135	...	12·946	12·645	3·016	·912	2·156	2·514	8·598	66·41	6·084	3,435,211	1·49	1·675
Perth	...	...	...	8·79	8·31	3·02	·66	·39	1·19	5·26	59	4·07	277,474	1·08	1·09
Plymouth ...	...	...	2,696	11·790	11·094	2·349	1·217	1·264	2·312	7·142	62·53	4·830	1,139,761	1·667	1·38
Pontypridd ...	355	...	...	12·16	11·99	2·78	·78	3·04	1·78	8·38	68·89	6·6	613,719	1·25	1·42
Rawtenstall ...	...	982	...	11·49	11·01	2·35	·92	1·49	1·78	6·54	56·69	4·76	734,781	1·38	1·33
Rochdale	7,423	5,004	...	11·019	10·980	2·524	·610	1·193	1·560	5·887	52·3	4·327	2,566,554	1·005	1·553
Rotherham ...	E. ...	...	750	12·56	12·50	2·86	·86	1·77	2·67	8·16	63·31	5·49	1,499,517	1·375	1·94
	R.T 552	...	...	10·36	10·36	2·35	1·15	2·66	1·56	7·72	74·56	6·16	64,520	1·375	1·13
Salford	...	...	22,000	10·692	10·673	3·023	·729	·909	1·942	6·603	62	4·661	9,260,898	1·226	1·60
Southampton ...	7,118	...	...	10·411	10·044	3·037	·825	1·579	1·921	7·362	71	5·441	2,000,301	1·5	1·31
Southend-on-Sea ...	2,514	1,000	6,000	13·14	12·97	3·05	·85	1·33	2·33	7·54	57·35	5·21	848,538	1·75	1·33
Southport	...	...	...	9·595	9·381	2·454	1·186	1·475	1·808	6·923	72·1	5·101	513,285	1·5	1·185
South Shields ...	(d) 500	4,218	1,600	10·066	9·919	2·253	·885	·729	1·566	5·433	56·28	4·077	914,188	1·407	1·122
Stalybridge, &c. ...	...	...	...	7·880	7·729	2·686	·887	1·387	1·425	6·385	81·33	4·960	1,719,696	·9	1·584
Stockport	...	250	11,250	10·77	10·57	2·323	·592	1·152	·936	5·063	47·02	4·067	1,897,114	1·069	1·327
Sunderland ...	...	...	5,000	11·208	11·149	2·999	·741	·760	1·834	6·334	56·81	4·50	1,764,971	1·5	1·19
Wallasey ...	...	2,500	7,500	11·035	10·928	3·280	·823	1·083	2·028	7·214	65·3	5·18	1,827,115	1·4	1·45
Walsall	1,480	...	1,000	11·234	11·007	2·675	1·068	1·561	1·905	7·209	64	5·304	845,654	1·68	1·176
Walthamstow ...	...	...	...	7·92	7·76	3·07	·55	1·40	1·71	6·73	84·97	5·02	1,426,964	1·375	1·24
Warrington ...	739	...	2,500	12·521	12·246	3·161	·966	2·096	1·798	8·021	63·273	6·223	545,817	1·5	1·199
West Ham ...	...	...	...	9·43	9·329	3·554	·761	1·823	1·313	7·451	78	6·038	6,103,884	·75	1·72
Wigan	...	...	...	12·05	11·80	...	...	...	...	6·84	56·77	5·09	2,132,384	...	1·471
Wolverhampton ...	...	...	3,777	11·250	11·086	2·518	·854	1·507	1·393	6·272	55·75	4·879	1,620,970	1	1·388
Yarmouth (Gt.) ...	1,062	...	...	8·605	8·425	2·655	·666	·938	1·564	5·823	67·95	4·259	655,315	1·60	·974

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

									*					Works Cost.	
Belfast	...	...	24,763	10·27	10·12	2·98	·55	1·31	·96	5·80	56·33	4·83	9,733,420	·589	1·40
Bexley	...	...	...	13·77	12·37	3·19	·73	2·20	1·1	7·22	66·6	6·12	405,140	1·1	1·52
Birkenhead ...	...	...	...	12·075	11·89	3·128	·779	2·016	1·141	7·064	58·49	5·923	2,490,715	·565	2·016
Bournemouth ...	...	10,321	...	12·24	12·20	2·85	·88	1·16	(b) 1·78	6·67	54·46	4·89	2,917,309	·583	1·55
Cardiff	3,980	...	9,400	12·014	11·83	3·449	1·026	1·409	·679	6·563	56	5·884	4,015,405	·438	1·54
Coventry ...	(l)185	(b)2,876	...	9·451	9·414	2·441	1·035	1·678	·668	5·822	61·6	5·154	1,533,212	·450	1·44
Glasgow	...	...	33,003	10·404	10·364	3·141	1·263	1·471	·495	6·370	57·88	5·875	32,280,346	·358	1·38
Huddersfield ...	...	13,370	6,590	11·04	10·73	2·70	·61	2·28	1·00	6·59	59·73	5·59	5,413,488	·42	2·27
Hull	...	1,435	12,000	9·42	9·33	2·82	·68	2·46	·67	6·63	71·04	5·96	4,855,082	·67	1·31
Leeds	...	...	70,005	11·145	11·042	2·967	1·073	1·070	·792	5·902	52·96	5·110	17,175,710	·493	1·801
Leicester	...	...	10,000	9·801	8·785	3·232	·620	1·285	1·423	6·560	66	5·137	7,141,333	·411	1·77
London	...	...	...	H. 8·75	8·53	4·32	1·07	1·50	5·02	11·91	136·50	11·91	...	...	...
				E. 10·04	9·73	3·36	·84	1·42	1·00	6·62	65·97	5·62	138,714,732	·619	2·62
N'castle-on-Tyne ...	...	21,189	12,000	11·958	11·451	3·238	·937	1·302	1·000	6·477	52·57	5·477	9,426,563	·394	1·972
Northampton ...	500	1,200	1,000	10·55	10·21	2·72	1·15	·93	1·34	6·14	58	4·80	934,909	·91	1·46
Portsmouth ...	11,374	(f) 3,000	4,000	12·229	12·035	3·220	1·136	·871	·582	5·815	47·55	5·233	2,599,210	·543	1·206
Preston	...	5,374	...	10·698	10·50	2·665	1·135	1·550	·600	5·95	55·63	5·35	1,516,545	·384	1·309
Reading	...	2,802	...	8·920	8·650	2·319	·970	·957	·880	5·126	57	4·246	1,033,313	·78	·99
Sheffield	...	7,032	37,716	10·760	10·668	3·367	·664	1·298	·847	6·176	57·389	5·329	16,500,208	·673	1·837
Wellington, N.Z.	8,299	...	...	15·654	15·568	5·864	·755	2·222	1·694	10·535	67·3	8·841	4,921,406	·80	2·13

* The figures given under "Power" in Table II. include actual works costs only. H—Horse lines. E—Electric trolley system. (b) Including ·88d. per car mile current supplied by Bournemouth and Poole Supply Company. (c) Horse account ·658d. (d) Accident, insurance, and compensation fund. (f) Insurance fund. (l) Including Insurance. (k) Insurance. (t) Amounts for 15 months.

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RECORDS OF ELECTRIC TRAMWAY ACCOUNTS.

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Population Served.	Car Mileage.	Passengers Carried.	Traffic Records. Passengers Carried per Car Mile.	Average Fare per Passenger. d	Average Journeys per Head of Popular'n per Annum.	Average Car Miles per Day per Car.	Traffic Revenue per Mile of Single Track. £	Average Traffic Revenue per Annum per Head of Popular'n Served.	Operating Expenses per Passenger. d.	Average Distance of 1d. Fare. Miles.	Average Fare Charged per Mile. d.	Average Speed per Hour. Miles.	Average Total Car Hours per Day.	Average Number of Cars in Use Daily.	Number of Cars in Stock.
Aberdeen ...	165,000	1,738,966	19,990,711	11·49	·95	121·15	105·8	2,930	9/6	·519	1·69	·6	7·5	655	45	77
Accrington ...	45,525	573,536	4,998,979	8·72	1·377	109·8	...	3,033	13/1	·84	...	...	...	...	...	27
Ashton-u-L.	50,000	462,060	4,928,282	10·666	1·081	98·565	105	2,712	8,10	·584	1·223	·81	8	190	12	23
Ayr	33,000	385,986	3,880,850	10·05	·96	117	106	2,079	9 6	·558	1·25	·75	8	140	10	20
Birmingham	...	14,268,244	146,930,986	10·29	1·03	...	79·77	5,482	...	·802	...	...	...	...	...	...
Blackburn ...	200,000	1,141,161	11,721,367	10·88	1·27	58·61	105	2,564	6/4	·87	1·25	·76	7·50	434	31	61
Blackpool ...	67,500	1,050,115	12,452,820	12	1·41	184·48	89·6	4,321	21/8	·765	...	...	8	...	32	72
Bolton ...	221,000	2,831,003	30,287,673	10·69	1·065	137·04	121·66	2,875	12/3	·588	1·468	·627	7·25	1,030	60	106
Bradford ...	354,000	5,971,561	62,005,976	10·383	1·086	175	113	2,703	15/11	·776	1·63	·504	7·3	2,232	144	242
Brighton ...	132,265	1,118,309	11,312,855	10	1·09	85·55	82·83	3,012	7/11	·84	1·27	·788	6·41	544	34	50
Burnley ...	175,000	1,449,647	15,949,359	11	1·18	91	95	3,620	9/1	·744	1·25	·83	7	760	40	57
Burton ...	48,000	437,106	3,188,655	7·30	1·082	66	...	1,684	5/10	·928	1·505	·58	7·5	...	...	20
Bury	128,202	1,431,126	15,831,487	10	1·06	123·5	98·80	2,028	10 10	·543	1·24	·85	8·81	483·83	45·26	54
Chester ...	39 028	346,645	3,067,815	8·85	·96	78·6	95	1,906	6·4	·626	1·27	·8	7	150·60	10·04	18
Chesterfield	38,000	289,745	2,631,398	9·08	1·1	69	122	2,407	6/8	·728	1·38	·75	7·33	126	7	14
Colchester ...	41 160	323,524	1,871,896	5·79	1·32	42·39	89·3	1,295	4 8	1·06	·85	1·09	6·81	157·92	9·87	18
Croydon ...	170,231	2,657,824	20,504,143	7·74	1·06	120·29	125	4,734	10 7	·775	2·15	·50	7·92	915·82	58	75
Darlington ...	58.000	381,920	3,791,835	9·9	·75	65·38	95·1	1,345	4/1	·557	1·219	·45	6·66	151·25	11	16
Darwen ...	40.611	252,710	2,755,011	10·91	1·24	67·83	...	1,989	7/-	·864	...	...	...	...	...	...
Derby ...	124,000	E 1,161,854	10,857,834	9·345	1·035	87·56	...	2,122	7/7	·707	1·44	·75	6·375	...	...	50
		H. 17,674	98,230	5·558	·962			...	...	1·36	1	1	..	...	...	3
Doncaster ...	52,000	516,540	5,072,172	9·81	·952	97·54	103	1,591	7·8	·652	1·25	·76	7·5	218	16	25
Dundee ...	165,000	1,359,821	17,734,162	13·04	·857	107	...	2,305	7/8	·533	2	·50	7·3	...	...	68
East Ham ...	130,000	1,375,433	17,775,698	12·92	·77	132	...	5,101	8 9	·61	1·80	·65	...	...	...	45
Exeter ...	48,660	433,507	4,110,513	9·48	·98	84·48	...	2,392	6/11	·612	1	1	6	...	16	20
Gloucester ...	53,972	628,946	4,200,432	6·7	·92	77	90·75	1,078	6/-	·78	1·5	·65	6·78	260·3	19	30
Halifax ...	176,000	2,152,391	19,456,923	9·04	1·27	110	79·5	1,912	11/11	·86	1·35	·84	6·8	814	74	95
Ilford ...	82.000	843,517	7,578,813	8·79	·831	92·42	...	2,312	5/1	·64	1·543	·69	8	...	...	26
Ilkeston ...	32,000	216,248	1,404,447	6·49	1·26	43·9	95	1,604	3/9	1·106	1·50	·633	7	93	7	13
Ipswich ...	75,300	668,025	5,554,585	8·31	·975	73·76	65·5	1,518	6/-	·75	1·53	·693	6·17	234·19	20·78	36
Keighley ...	43.000	242,500	3,099,272	12·8	·68	72·08	55·35	1,447	4/1	·462	2·22	·45	6·87	126	7	12
Kilmarnock ...	36.000	297,557	2,317,709	7·78	·879	64·38	90·05	1,537	4/8	·616	1·13	·86	7·22	112·58	9·05	14
Kirkcaldy ...	39.600	473,089	5,237,947	11·07	·719	132·27	59	1,786	7/11	·46	1·522	·64	7·5	195	15	22
Lancaster ...	41,414	171,475	1,461,104	8·52	·893	35	75	1,132	2/8	·854	1·71	·5	8	88·2	6·3	12
Leith ...	110,400	944,329	9,706,611	10·28	·87	87·92	125	1,926	6/3	·482	1·32	·72	8·3	311	20·66	37
Leyton ...	124,735	1,802,647	17,476,453	9·69	·945	140	112	3,719	11/-	·727	...	...	8	...	...	60
Lincoln ...	20.000	160,446	1,733,259	10·8	·92	86·66	64·08	2,264	6,8	·556	1·75	·428	7	90	5	8
Liverpool ...	839,000	13,442,605	144,085,927	10·72	1·129	172	77	5,695	16/2	·744	2·514	·39	7·5	4,920	480	595
Lowestoft ...	35,000	315,341	2,613,797	8	1·04	70	72	2,788	6/6	·764	1·5	·7	5·75	192	12	19
Maidstone ...	25.000	295,438	2,224,200	7·528	1·053	88·968	81	1,387	7/1	·73	1	1	6·7	128	12	19
Manchester	915,280	19,463,646	205,608,741	11	1·06	218	94·7	5,054	19 3	·683	...	...	...	...	...	662
Nelson ...	45,000	200 996	2,776,785	13·82	·88	61·71	94·09	2,650	4/4	·555	1	1	5·50	108	6	11
Newport ...	87,626	968,067	9,251,181	9·56	·973	105·6	...	2,617	8/7	·821	1·75	...	...	...	37	44
Nottingham	260,000	3,485,789	38,484,032	11·04	1·02	148	92·08	4,514	12/8	·67	1·63	·65	6·86	...	104	135
Oldham ...	180,000	2,049,916	21,435,727	10·457	1·19	119·087	109·5	2,962	12/-	·822	1·115	·884	6·84	820	51·25	92
Perth	35,000	252,940	1,813,228	7·16	1·15	50·5	96·25	1,298	4/7	·73	...	...	6·25	120	8	12
Plymouth ...	112.000	820,406	8,839,974	10·77	1·029	78·92	...	2,528	6/9	·663	...	...	...	...	...	42
Pontypridd ...	40.000	432,006	5,047,168	11·68	1·02	126	81·2	2,509	10/9	·71	1·25	·51	6·5	221	17	26
Rawtenstall	50,000	553,813	4,949,775	8·93	1·23	98·72	126	1,600	10/2	·73	1·12	·88	9	198	12	24
Rochdale ...	130.000	1,749,967	13,740,152	7·91	1·38	105·7	114·90	2,008	12/4	·734	1·07	·90	7·66	645	43	69
Rotherham ...	64,000	E 772,610	8,774,539	11·35	1·104	137·12	...	3,352	12/7	·719	...	...	...	...	...	...
	...	RT 56,887	191,088	3·36	3·08	...	...	...	...	2·3	...	...	...	...	...	...
Salford ...	350.000	5,854,830	50,113,120	8·559	1·243	143	111	3,425	14 10	·771	1·85	·65	7·853	2,075·18	144	200
Southampt'n	122.200	1,533,638	12,475,793	8·134	1·235	102	...	3,482	10 6	·90	...	...	...	...	...	70
Southend ...	78.000	637,366	7,581,104	11·89	1·09	97·2	87	4,708	8/10	·634	1·41	·76	6·5	357	21	31
Southport ...	31,312	433,068	4,401,336	10·63	·923	140·5	103	1,574	10/10	·68	1·6	·62	6·68	217·5	13·5	26
So'th Shields	110,513	814,212	8,456,688	10·386	·942	76·5	129·2	3,332	6/1	·545	1·825	·54	7·61	282	16	35
Stalybridge	92,933	1,085,545	8,896,836	8·123	·943	95·7	...	1,280	7/6	·779	1·275	·764	6·8	...	...	60
Stockport	120,000	1,429,396	11,544,225	8·0	1·39	96·20	78·32	2,290	10 5·9	·627	1·3	·7	7·5	471	29	53
Sunderland	170,000	1,474,637	16,972,537	11·5	·968	99·8	79·3	3,366	8/1	·550	1·34	·68	7	672	42	70
Wallasey ...	83.000	1,261,858	12,352,000	9·78	1·11	148·94	98·7	2,893	13/10	·99	1·89	·54	7	...	...	61
Walsall ...	100.000	719,372	6,121,381	8·509	1·293	61	86	1,885	6/7	·847	1·24	·79	7	345	23	39
Walth'mst'w	128.000	1,151,029	11,807,549	10·258	·756	91·89	93	2,968	5/11	·655	1·15	·89	7·2	408	36	38
Warrington	86.000	455,304	6,154,545	13·473	·909	71·332	102·423	2,406	5/5	·59	1·246	·803	6·401	194·86	12·179	21
West Ham ...	294,200	3,544,292	40,200,347	11·34	·822	136	98	4,592	9/4	·65	1·80	·56	7·66	1,262·25	99	118
Wigan ...	200,000	1,449,188	13,018,833	8·98	1·314	65·1	105·5	2,309	7/2	·761	1·15	...	7·4	...	42	67
Wolverh'ton	135,000	1,168,239	11,913,122	10·198	1·08	88·25	87	2,510	8/-	·615	1·18	·879	6·85	622·2	36·6	49
Yarmouth ...	55,800	673,027	4,514,871	6·7	1·256	80·91	73·7	1,687	8/6	·868	1·25	·76	7	375	25	35

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast ...	385,492	5,946,659	58,437,942	9·82	1·07	151	128	2,539	13/-	·592	1·96	·43	8·75	2,256	141	282
Bexley ...	16,500	264,864	2,090,533	7·89	1·57	127	130	2,100	16/6½	1·16	1·59	·63	10	17	8	16
Birkenhead	130,832	1,235,277	13,622,361	11·02	1·077	104·12	68·64	2,540	9/4	·702	1·39	·66	6·61	511·73	49·30	59
Bournem'uth	120,000	1,882,054	15,750,576	8·36	1·45	131	95	3,214	16/-	·796	1·19	·87	6·80	1,140	60	81
Cardiff ...	182,729	2,614,901	28,365,277	10·84	1·09	155	98·25	4,062	14/1	·713	1·44	·736	7·5	1,120	70	130
Coventry ...	135,000	994,207	7,639,065	7·7	1·23	57	68	2,516	5·1	·757	1·18	·866	6·4	424	35	41
Glasgow ...	1,150,000	23,335,008	311,480,086	13·348	·776	270·85	105·49	5,139	17/6	·477	2·31	·44	8·13	8,484·59	606·04	843
Huddersfield	160,000	(a) 2,383,858	21,595,569	9·09	1·18	144	120	3,675	13/4	·728	1·39	·70	7·48	868·32	54·27	86
Hull	287,032	4,040,739	42,937,226	10·64	·877	149·80	127·10	5,141	10/7	·631	2·75	...	9	1,393·6	87·10	160
Leeds ...	525,000	9,204,331	93,679,774	10·17	1·081	178	115·41	3,694	16/2	(b) ·916	1·93	·539	7·56	3,335	222	315
Leicester ...	230,970	4,028,542	37,073,717	9·202	·954	161	...	3,985	12/9	·712	2·18	·984	8	...	...	150
London ...	...	H 1,086,481	11,550,504	10·93	·78	...	77·12	2,365	...	1·09	...	...	5·85	500·84	38	74
		E82,886,623	501,102,149	9·48	1·03	...	117·15	7,867	...	·69	...	...	8·82	16,427·36	1,237	1,661
Newcastle ...	300,000	4,780,662	52,204,974	10·92	1·082	174	...	3,738	15/2	·593	1·58	·633	7	...	...	192
Northampt'n	90,793	640,158	6,727,190	10·51	·97	76·53	...	2,974	6/-	·58	1·34	·7	6·91	...	...	26
Portsmouth	241,256	2,155,508	24,520,647	11·37	1·052	101·63	84	3,505	9/-	·511	1·66	·62	7	1,072	72	100
Preston ...	120,000	970,719	9,567,366	9·85	1·06	79·73	132	2,498	7/2	·603	1·01	·96	7·36	...	...	33
Reading ...	76,000	915,180	8,251,274	9·01	·97	108	97	2,505	8·8	·57	1·59	·68	7	352	26	36
Sheffield ...	466,408	8,071,188	96,350,242	11·935	·893	206·535	103·32	4,606	15·5	·517	2·62	·386	7·372	3,103·87	214·019	279
Wellington ...	68,000	2,303,913	23,858,412	11·08	1·40	350	90	4,706	43/11	·94	1·112	·88	7·86	803	70	89

E—Electric trolley system. H—Horse lines. (a) Including 9,417 miles coal haulage. (b) Total expenses per passenger.

TRAMWAY AND OMNIBUS SHARE LIST.

Specially Compiled for "The Tramway and Railway World."

Amount Ranking for Dividend.	Shares.	Name.	Div'd. Prev. Half-year.	Div'd. Last Half-year.	Quotations, June 2.	Movement Since April 30. Rise.	Fall.	Latest Business Done. Price.	Date.	Yield on Buying Price. £ s. d.	Dividend Due. (Final in Italics.)	Quotations, Jan., 1908, to June 2, 1914. Highest	Lowest
$6,000,000	$100	Alabama Traction 5% Bonds	5	5	69½—71½	...	...	67	May 19	7 3 0	Mar., Sept.	86	67
640,000	5	Anglo-Argentine Tramways 5½% Cum. 1st Pref.	2/9	2/9	4¾—4⅞	+ 1/16	...	4 7/32	May 29	5 13 0	Jan., July.	5 5/32	4 3/4
500,000	5	Do. do. 5½% Cum. 2nd Pref.	2/9	2/9	4¼—4½	...	— 1/16	87/6	May 28	6 2 3	June, *Dec.*	5 3/32	4 1/16
1,500,000£	...	Do. do. 5% Deb. Stock Red.	5%	5%	94½—96½xd	+ ½	...	96	June 2	5 3 9	June, Dec.	105½	94
325,532£	Stk.	Auckland Elec. Trys. Co. 5% Mort. Deb. ...	5%	5%	103—106	...	...	105½	May 6	4 14 6	Jan., July.	107	99½
75,000	1	Bath Electric Tramways 5% Cum. Pref. ...	6d.	6d.	1/16—1/8	...	...	10/6	Mar. 3	7 5 6	*Jan. & July*	11/8	1/16
334,696£	Stk.	Birmingham Dist. Pow. & Tract. 4½% 1st Deb....	4½%	4½%	84½—86½	...	— ½	86	Feb. 12	5 6 6	Jan., July.	96	77
15,000	10	Blackpool and Fleetwood Tramways	4/-	13/-	13½ -14	...	...	14	May 28	6 1 6	Feb., Aug.	16	12
60,000	10	Bombay Elec. Supply & Trys. Co. 6% Cum. Pref.	6/-	6/-	10½—11½	...	...	10 1/16	May 4	5 7 3	Feb., Aug.	12	7⅞
1,003,614	$100	Brazil Traction...	6%	6%	80½—82½	+ 2	...	82	June 2	7 9 3	Fb.My.Ag.Nv.	105½	76¼
75,000	5	Brisbane Elec. Tramways Investment Co. Ord.	4/-	4/-	6⅜—7⅛xd	...	...	8	May 20	5 12 3	*May*, Oct.	9¼	3 1/16
75,000	5	Do. do. do. 5% Cum. Pref.	2/6	2/6	4½—5¼xd	...	...	5⅛	May 13	4 15 3	*May*, Nov.	5⅜	4⅜
50,000	10	Bristol Tramways and Carriage Co.	4	5	5½—6½	...	— ⅛	5⅛	Oct. 29	7 4 0	*Feb.*, Aug.	14½	5
50,000	10	Do. do. do. 4% Cum. Pref.	4	4	7⅜—7⅝	+ ⅛	...	6⅝	Nov. 21	5 5 0	Jan., July.	9½	6⅞
800,000£	Stk.	British Columbia Electric Railway Def. Ord. ..	8%	8%	110—114	...	— 2	110½	May 28	7 0 6	May, Nov.	156	99⅜
800,000£	Stk.	Do. do. Pref. Ord.	6%	6%	103—107	...	— 1	104½	May 28	5 15 0	Feb., Aug.	132⅜	99
800,000£	Stk	Do. do. 5% Cum. Perp. Pref.	5%	5%	103 - 106	+ 1	...	104½	June 2	4 16 6	Jan., July.	114	98
1,070,097£	Stk.	British Electric Traction 6% Prefd. Ord. ...	...	...	14½—16½	...	— 1	13	May 25	...	Apr., *Oct.*	18	8
403,503£	Stk.	Do. do. 6% Cum. Pref. ...	6%	6%	88½—91½	+ ½	...	90	May 27	6 15 6	Feb., *Aug.*	95½	73
1,464,245£	Stk.	Do. do. 5% Perp. Deb. ...	5%	5%	92½—94½	+ ½	...	94	May 26	5 6 6	April, Oct.	101	82½
439,796£	Stk.	Do. do. 4½% 2nd Deb. Red. ...	4½%	4½%	77—80	...	...	77	May 27	5 12 6	May, Nov.	84	58
246,625£	Stk.	Buenos Aires Port & City Trys. 6% 1st Mt. Deb.	6%	6%	73—78	...	...	71	Mar. 24	7 14 0	Feb., Aug.	103	61
623,270£	Stk.	Buenos Ayres Lacroze Trys. Stg. 5% 1st Mt. Deb.	5%	5%	99½—101½	...	— ½	101	May 27	4 18 6	Mar., Sept.	103	89
137,610	5	Calcutta Tramways Ord.	2/6	7/-	6½—7	...	— 1/16	6 5/16	May 25	6 15 9	*Apr.*, Oct.	7⅜	4
47,295	5	Do. 5% Cum. Pref.	2/6	2/6	5—5½	...	...	5⅛	May 23	4 15 3	Jan., July	5⅜	4⅛
491,222	1	Cape Electric Tramways	1/-	for yr.	⅜—½	...	...	13/3	May 12	6 13 6	Feb., *Nov.*	1/2	⅜
15,000	10	Carthagena and Herrerias Steam Tramways ...	4/-	May, '13	2½—3½	...	...	62/6	Mar. 3	5 14 3	April.	7	2½
248,000	5	City of Buenos Ayres Tramways (1904) ...	2/6	2/6	5 1/16—5 1/16	...	— 1/16	5⅛	May 26	4 12 0	Fe My.Au No	6	5⅛
120,000£	Stk.	Colombo Elec. Trys. & Ltg. 5% 1st Mt. Deb. ...	5%	5%	90—94	+ 3	...	90	Jan. 7	5 6 6	May, Nov.	101	87
11,500	10	Cork Electric Tramways and Lighting Co. ...	...	6/- ann.	4—4½	+ 1/0	...	4 1/2	Dec. 23	6 13 6	*Mar.*	10	4
12,327	10	Do. do. do. 5% Cum Pref.	5/-	5/-	6⅜—7	...	...	6⅛	Jan. 29	7 3 0	Jan., July	10⅜	6⅛
3,000	10	Dublin and Lucan Elec. Railway 5% Cum. Pref.	5/-	Nil	6—7	...	...	9	Aug. 25/10	..	Sep.15, Mar.15	9½	6
60,000	10	Dublin United Tramways Co. (1896), Ltd., Ord.	6/-	5/-	10½—11	...	...	10⅛	May 29	5 0 0	Feb., Aug.	14	10⅜
60,000	10	Do. do. do. 6% Cum. Pref.	6/-	6/-	11⅛—12⅛	...	— 1/16	12	May 28	4 18 0	*Feb.*, Aug.	14	11⅛
268,235	10/-	Hastings and District Elec. Trys Ord.	...	...	½—¾	...	— 1/32	1/3	April 17	...	...	1/8	1/32
80,000	1	Do. do. 6% Cum. Pref. ...	6%	6%	⅛—¼	...	...	10/9	April 17	8 14 6	...	3/8	1/8
125,000£	Stk.	Do. do. 4½% Deb. Stk. Red.	4½	4½	65—70	...	...	65	April 15	6 8 9	April, Oct.	100	65
$9,634,000	$1,000	Havana Elec. Rly. Co. Con. Mort. 5%	5%	5%	93½—97½	...	...	97½	April 23	5 7 6	Feb., Aug.	105	80
195,000£	100	Hong Kong Tramways Co. 5% Mt. Deb. ...	5%	5%	83½—87½xd	...	...	87	Feb. 9	6 5 9	May, Nov.	92	75½
20,000	10	Imperial Tramways Ord.	Nil	4% year	3—3½	...	...	3	Mar. 4	11 8 9	Feb., Aug.	9⅜	2½
20,000	10	Do. 6% Cum. Pref.	...	6% year	6⅜—6⅝	...	...	6 7/32	Ju. 28/09	8 18 0	Jan., July.	9⅜	2⅜
30,000	5	Isle of Thanet Elec.Try.& Ltg. Co.5% Cum.Pref.	3/-	Dec. '18	2—2½	...	...	45/-	May 15	6 0 0	*Mar.*, Sept.	3	0⅞
170,000	1	La Plata Elec. Trys. Co. 6% Cum. Pref. ...	0/4·80	0/7·20	⅝—⅞	...	...	17/-	Oct. 14	6 12 0	*April*, Oct.	1 1/16	0½
30,800	10	Lanarkshire Tramways	6/-	6/-	9¼—10⅜	+ ⅛	...	10⅛	May 28	6 0 6	Feb ,Aug.	10⅞	9⅛
250,000£	Stk.	Lancashire United Trys. 5% Prior Lien Deb....	5%	5%	87—89	...	...	87½	April 25	5 14 0	Jan., July.	95	76
634,026	1	Lisbon Electric Tramways Ord.	7⅛d.	7⅛d.	1⅛—1 1/16	...	— 1/32	22/3	Aug. 25	4 11 6	*July.*	1 3/32	3/4
425,553	1	Do. do. 6% Cum. Pref ...	7⅛d.	7⅛d.	1⅛—1 1/16	...	...	23/-	Mar. 10	5 13 0	Jan., July.	1½	1/2
1,833,136	1	London and Suburban Traction Ord.	...	...	1/16—⅛	...	...	3/9	May 19	...	...	5/9	3/9
1,581,059	1	Do. do. do. 5% Cum. Pref.	5	5	⅛—⅜	+ 1/16	...	11/9	May 26	7 5 6	Feb., Aug.	14/-	10/6
1,000,000£	Stk.	London General Omnibus 4½% 1st Deb.	4½	4½	99—101	+ ½	...	101	May 29	4 11 0	Jan., July.	98½	92½
1,000,000£	Stk.	Do. do. 5% Cum. Income ...	5	5	88—91	...	— 1	88½	May 22	5 11 9	Feb., Aug.	95	85½
1,649,930£	Stk.	London United Tramways 4% 1st Deb. Stk. ...	4	4	56—60	...	...	58	May 11	6 13 6	*Jan.*, July.	82	54¾
63,430£	Stk.	Madras Elec. Trys. (1904) Ltd. 5% Deb. Red. ...	5%	5%	101—103	...	...	101½	Oct. 16	4 17 3	Jan., July.	105	86
20,000	5	Do. Do. Do. 6% Cum. Pref. ...	6%	6%	4⅞—5½	...	...	5 1/2	Mar. 12	5 14 3	Ma., Sept.	5⅜	87/6
300,000£	100	Manaos Trys. & Ltg. Co. 5% 1st Debs.	5%	5%	78—81	...	...	81	Feb. 20	6 5 9	Jan., July.	97	79
$4,785,000	$1,000	Manila Elec. R. R. and Ltg. Corp. 5% Gld. Bds.	5%	5%	98½—100½	...	...	98½	June 2	5 2 0	Mar., Sept.	104⅜	84
60,000	1	Mansfield & District Trys. Ltd. 6% Cum. Pref.	7⅛d.	7⅛d.	1⅛—1 1/16	...	...	18/6	Sept. 24	5 13 0	Mar., Sept.	1 1/16	3/4
$20,000,000	$100	Mexico Tramways Common Stock	$1⅞	Nov. '13	71—75	+ 6	...	73	June 2	...	Fb.My.Au.No	151½	59
$3,840,000	...	Michigan Untd Rys. Co. 5% 1st Debs & Refdg Bds	5%	5%	90—92	...	...	91	May 26	5 7 0	May, Nov.	101½	89½
600,000£	100	Montreal Street Rly. 4½% Ster. Debs.	4½%	4½%	98—100	...	...	98½	May 19	4 10 0	Fe.My.Au.No.	107	97
150,000	1	National Steam Car	6%	year	⅝—⅞	+ 1/16	...	14 3	May 29	7 13 9	Dec.	39/9	13/3
5,000	10	Oldham, Ashton, and Hyde Elec. Tramways Ord.	5/-	7/-	6½—7	+ ⅛	...	7	Apr.2/13	8 11 6	Mar., Aug.	9⅜	5⅜
5,000	10	Do. do. do. 5% Cum. Pref.	5%	5%	6½—7	+ ½	...	6½	May 25	7 3 0	Feb., Aug.	8⅜	6 1/16
77,893	5	Para Elec. Rly. and Ltg. Co., Ord.	5/-	5/-	3¾—4⅛	...	...	4 1/16	May 25	11 8 6	May, Nov.	8	4
245,000	1	Potteries Electric Traction Ord.	3½	for '13	⅛—3/16xd	...	...	7/6	May 6	8 12 6	April.	⅜	1/8
245,000	1	Do. do. 5% Cum. Pref. ...	6d.	6d.	1/16—⅛	...	...	11/3	April 17	7 12 6	*Feb.*, Aug.	⅛	1/16
124,560	1	Provincial Tramways Ord.	8d.	1/-	1/16—⅛	...	...	20/-	May 25	8 17 9	May. *Nov.*	1 1/16	13/-
10,000	10	Do. do. 6% Cum. Pref.	6/-	6/-	10—10¼	...	...	10 1/16	April 21	5 17 3	June. *Dec.*	11	9
50,000	5	Rangoon Elec. Trys. & Supply Co. 6% Cum. Pref.	3/-	3/-	5—5⅛	...	...	5 1/16	May 8	5 9 3	June, Dec.	6	5
32,000	10	Shanghai Elec. Construction Co.	14/-	year	12⅜—13⅜xd	...	...	13 1/16	May 28	5 2 9	May.	13 1/16	6
330,400£	Stk.	Singapore Elec. Trys. Ltd., 5% Debs. Red. ...	5%	5%	88—92	...	...	89	April 2	5 8 9	Mar., Sept.	92	61
91,720£	Stk.	Southern Elec. Trys. of B.A., 1st Mt. Deb. ...	5%	5%	95—97	...	...	96 3/4	Mar. 3	5 3 3	Feb., Aug.	100⅜	90
471,500£	100	Toronto Rly. Co. 1st Mt. 4½% Stg. Bonds ...	4½%	4½%	97—99	...	...	98	May 7	4 11 6	Feb., Aug.	104	97
80,000	5	United Elec. Tramways of Monte Video, Ord....	4/-	3/-	4⅜—5⅛	...	...	98/9	May 19	6 16 9	*June*, Dec.	6⅛	4⅜
90,000	5	Do. do. do. 6% Cum. Pref.	6/-	3/-	4⅜—5⅛	...	...	4 3/16	May 5	5 14 3	June, Dec.	6⅜	4 1/16
500,000£	Stk.	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Debs.	4½%	4½%	93½—95½	...	...	94¾	May 29	4 14 3	Apr., Oct.	109⅜	93⅓
40,977	5	Yorkshire (West Riding) Elec. Trys. Ord. ...	...	...	½—⅝	...	— 1/16	7/6	Feb. 4	...	*Mar.*	1⅛	⅜
46,261	5	Do. do. do. 6% Cum. Pref.	1/6	2/6	4½—4⅞	...	...	90/-	May 11	4 2 3	*Mar.*	4⅞	1⅞

ELECTRIC RAILWAY STOCKS.

1,854,720£	Stk.	Central London Ord. Stock (4% Guar.)	...	4	82—84	...	...	82	May 15	4 15 3	*Feb.*, Aug.	89⅛	59⅞
572,640£	Stk.	Do 4% Guar. Pref. Stock	4	4	84—86	+ 1	...	85	May 11	4 13 0	Feb., Aug.	92	80
572,640£	Stk.	Do. Deferred Stock (4% Guar.) ...	...	4	80—82	...	...	81½	May 29	4 17 9	Feb., Aug.	91⅜	42
50,000	10	Liverpool Overhead Ord.	2/6	3/6	4¼—4½	+ ¼	...	4 5/8	May 27	6 6 6	*Feb.*, Aug.	4¼	⅛
1,412,263£	Stk.	Mersey Cons. Ord. Stock	Nil	Nil	5½—6	...	— ¼	6	May 28	...	*Feb.*, Aug.	8	1
5,732,062£	Stk.	Metropolitan Cons.	1½	1½	39½—40	...	— 1/8	39⅞	June 2	4 1 3	*Feb.*, Aug.	75⅛	34
2,640,914£	Stk.	Do. Surplus Lands Stock	2½	2½	60—62	...	— 3	60½	June 2	4 8 9	Feb., Aug.	72	58
3,235,000£	Stk.	Metropolitan District Ord.	Nil	Nil	22⅜—23½	...	— 4	23	June 2	...	*Feb.*, Aug.	51½	9⅛
500,000	10	Underground Electric Railways Co. of London ...	...	...	3⅛—3⅜	...	...	65/7½	May 29	...	...	5 1/16	1⅛
1,730,000£	...	Do. 4½% Bonds of 1933	4½%	4½%	99⅛—101⅛	...	...	101	May 28	4 9 6	Jan., July	102	73
1,192,707£	...	Do. 6% 1st Income Debs.	6%	6%	115—117	+ 1	...	116	June 2	5 3 6	Mar., Sept.	118	108
6,120,750£	Stk.	Do. 6% Income Bonds	60/-	60/-	89—90	...	— 1	89½	June 2	6 12 0	Mar., Sept.	97½	18
1,150,477	1/-	Do. "A" Ord.	...	...	⅞—1	...	...	9/-	June 2	...	...	1	⅜

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Rangoon Electric Tramway and Supply Company.—After adding £12,500 to the renewals fund and £2,000 to the special reserve for cables, and providing for expenses of debenture issue, the net profits for 1913 were £25,924, and £751 was brought forward. A dividend of 6 per cent. is proposed on the ordinary shares, free of income tax, carrying forward £1,055.

Tire and Rubber Dividends.—The Parent Tire Company have declared an interim dividend at the rate of 5 per cent. per annum on the preference shares for the six months ended February 28.—The Dunlop Rubber Company's directors have declared an interim dividend at the rate of 10 per cent. per annum on the ordinary shares for the six months ended February.

Blackpool Tramways Profit.—The income of the Corporation Tramways for the year ended March 31 was £84,797, compared with £74,166 the previous year. The gross profit was £41,310, compared with £34,484, and the disposable balance is £24,522, against £18,331 the previous year. £12,000 is to go to the relief of the rates, and the balance to the renewal fund. The passengers numbered 12,992,771, an increase of 1,671,623.

Babcock and Wilcox, Limited.—At the annual meeting of Babcock and Wilcox, Limited, Mr. J. H. Rosenthal (the chairman) said that the net profits for the year, with the balance brought forward, amounted to £510,087. An interim dividend of 7 per cent. on the ordinary shares had been paid, and the board recommended a further distribution of 9 per cent. They further proposed to place £150,000 to the reserve, and £10,000 to the staff pension fund, leaving £73,834 to be carried forward.

Worcester Electric Traction Company.—The report states that the revenue for 1913 amounted to £18,070, as compared with £15,771. After meeting expenses chargeable to revenue and providing £2,139 for renewals, there remains a net balance of £4,539. To reserve £1,000 is placed, and a dividend is to be paid on ordinary shares at the rate of 3½ per cent. for the year, carrying forward £200. The net revenue increased £1,633, due chiefly to the fine summer and to additional motor omnibus services.

Bury Corporation Tramways.—The working for the year ended March 31 last shows a profit of £9,124 on the Bury section. On the Ratcliffe section, under the first agreement, there was a profit of £1,302, and under the second agreement there was a loss of £279, to which loss one moiety will be met by Radcliffe Urban Council, and the other moiety by the Corporation. £1,000 is to be carried to the insurance fund; £3,124 to the reserve and depreciation fund, which now stands at £27,486, and £5,000 to the credit of the borough rate.

Sunderland District Tramways Company.—The report on the past year's trading states that after providing for interest on the prior lien bonds, and the first mortgage debentures, sinking fund instalment and balance of receivership expenses, and transferring a sum of £1,000 to reserve account for law costs, etc., there remains a net profit of £2,717. Of this amount the directors have decided to transfer £2,000 to reserve account, leaving £717 to be carried forward. Traffic receipts show an increase of £4,608. Sixteen new cars have been put into service.

Hong Kong Tramway Company.—The net profits for 1913 were £10,508, after providing for debenture interest, and £7,127 was brought forward. A final dividend at the rate of 20 per cent. per annum, free of income tax, is proposed, making 12½ per cent. for the year, and leaving to be carried forward £7,479. The Hong Kong Government contributed $15,248 further as compensation towards the company's losses during the boycott, making a total of $45,248, but there is still a considerable loss incurred on the Hong Kong (British) subsidiary coinage.

Carthagena and Herrerias Steam Tramways Company.—The report for 1913 shows a working profit of £12,607. Deducting debenture interest, £6,000, including interest, £4,600, and amount set aside for their redemption, £1,400, and adding the balance brought forward of £2,492, there is a balance to the credit of new revenue of £9,100. The directors have applied £1,000 to renewal account, and they recommend the payment of a dividend at the rate of 2 per cent., or 4s. per share, leaving £5,100 to be carried forward. The gross receipts show an increase of £5,353, and the working expenses an increase of £1,351.

Sunderland District Electric Tramways.—Mr. H. R. Hogg, who presided at the annual meeting on May 5, said the accounts presented were those for the first year since the directors had had the system in their own hands from the receiver. They had received delivery of 16 new cars, and that had enabled the manager to do away with the last of the old French cars. The net earnings showed an increase of some £3,000. As no depreciation had been written off for some years, the board had thought it right to put aside a substantial sum. The most cheering point in the future of the company was the growth of the mining population all along the line.

Swansea Improvements and Tramways Company.—Mr. C. G. Tegetmeier, presiding at the annual meeting on May 4, said the number of passengers carried last year was 12,008,000, an increase of 1,180,000. He attributed the great increases since 1907 to the growth of the prosperity of Swansea. The dividends had increased during the period from 2½ per cent. to 6 per cent. The report was adopted, the available balance of £16,584 being allocated as follows: To the reserve fund, £4,000; dividend on preference shares at 6 per cent., £590; dividend on preference shares at 5 per cent., £2,008; dividend on ordinary shares at 6 per cent., in respect of which an interim dividend at the rate of 5 per cent. for the half-year was paid in October, £7,800; carried forward, £2,185.

Hastings and District Electric Tramways Company.—At the annual meeting on May 5 the directors' report recommended a final dividend at the rate of 6 per cent. per annum on the preference shares, making 6 per cent. for the year; placing £2,990 to depreciation account, making that fund £25,000, writing £1,000 off suspense account, and carrying £1,037 forward. The chairman (Mr. G. Kitchen) stated that the Tilling-Stevens petrol-electric cars had been installed on the sea front in place of the Dolter system. They then had six cars in service, and a further 11 were under order. The new cars were running satisfactorily. During the year there had been an increase in the receipts amounting to £3,638, principally due to the fine summer, but the increase had involved extra expenditure, as they had run 67,000 more car-miles.

Blackburn Corporation Tramways.—The report of Mr. J. H. Cowell, general manager, shows that the receipts amounted to £71,338, an increase of £4,655, and working expenses £47,170, an increase of £4,654; the balance of £24,168 is almost the same as that of last year. Interest and repayment of loans, contributions to sinking fund, and income tax require £20,157, leaving a profit balance of £4,011, as compared with £3,870. The percentage of working expenses to receipts is 66·10. The receipts from parcels amounted to £2,310, an increase of £116. Passengers numbered 12,731,532, and car miles, 1,149,462. The average energy consumption was 1·64 units. The average total revenue per car-mile was 14·08d., and total working expenses, 9·43d. There are now 61 cars. During the year 20 meters for current consumption were purchased, a further portion of the track has been relaid, out of revenue, and a shelter has been erected

Satisfactory Results at Nottingham.—The revenue for 1913-14 amounted to £175,379, an average of 11·87d. per car-mile. This is an increase of £8,218 and ·37d. per mile. The working expenses amounted to £108,422 (an increase of £148, or 7·34d. per car-mile, as against 7·45d. the previous year), leaving a balance of £66,957, which has been disposed of as follows: Interest on stock and loans, £14,123; repayment of capital, £20,270; reserve and renewals fund, £7,013; removal of centre poles, £1,000; part cost of Parliamentary bill, £550; in aid of general district rate, £24,000. The sum of £9,792 was expended on the maintenance of cars, £8,891 on permanent way, and £936 on overhead electrical equipment. Renewals amounting to £4,629 were charged against the reserve and renewals fund, which now stands at £68,372. Other statistical information was as follows:

	1912-13		1913-14
Percentage, expenses to receipts	64·19	...	61·82
Expenses per car-mile (including interest and repayment of capital)	9·80d.	...	9·67d.
Units of electrical energy used...	7,761,095	...	5,359,804
Average units per car-mile	1·65	...	1·51
Number of car-miles run	3,485,789	...	3,543,669
Number of passengers	38,484,032	...	40,535,874
Average passengers per car-mile	11·04	...	11·43
Average journeys per head of population	148	...	155
Average fare paid per passenger	1·02d.	...	1·02d.
Average daily number of cars in service	104	...	105
Average length of penny stage...	1·68 miles	...	1·70 miles

BOSTON TRANSIT COMMISSION.

The nineteenth annual report, June 30, 1913 (E. W. Doyle, printer, Boston), though only covering 95 pages, contains a well-edited record of good work. No commission can have served the purpose for which it was appointed more successfully than that which was appointed to deal with the local traffic problem of Boston, Massachusetts. Owing to narrow streets and the singular geographical situation of the city the congestion in the central district presented a very difficult problem, and has necessitated the construction of subways at great cost. The total amount expended from the beginning to June 30, 1913, has been approximately £4,500,000, of which no less than £600,000 was disbursed in the preceding 12 months. Full details are given, together with plans and sections accompanying the report, and a folding map, 36 in. by 33 in., on a scale of 500 ft. to an inch, showing the various tunnels and subways, besides 11 other plates, 26 appendices, and the report of the chief engineer, Mr. Edmund S. Davis. The Hon. George C. Crocker, the chairman, who had been a member of the commission from the beginning, and George A. Kemball, chief engineer of the Boston Elevated Railway for many years, and who had often helped the commission, died during the twelvemonth. Mr. George F. Swain was unanimously elected chairman in June. The terms of the commission will expire on July 1 this year, but several seasons will be required for completing the work now in hand, and provision will have to be made for its continuation and completion.

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PERSONAL.

Mr. C. Crossley has been appointed superintendent in the Chesterfield tramways department.

Councillor Wm. Phillips has been appointed chairman of Pontypridd Electricity and Tramways Committee.

Mr. R. H. Lee, resident engineer at Stockport Council's generating station, has been appointed chief assistant engineer.

Mr. J. W. Horton has been confirmed in the appointment of traffic superintendent to York Corporation tramways.

Mr. C. Burgess, general manager and engineer, West Hartlepool Corporation tramways, has been granted an increase of salary of £50.

Mr. F. F. Bideleux, late chief accountant of the Lacroze Tramway Company, has started as an independent accountant at Calle Reconquista 424, Lacroze.

Mr. C. Garnett, electrical engineer to Darwen Council, has been recommended by the Electricity Committee for an increase of £50 a year in his salary.

Mr. H. A. Howie, deputy city electrical engineer at Sheffield, has been appointed electrical engineer to Walsall Council at a commencing salary of £500 per annum.

Mr. E. Poole, assistant borough electrical engineer at Durban, left for England on April 26, on 6 months' leave. His address will be Pentowan, Hayle, Cornwall.

Sir T. D. Pile, ex-Lord Mayor of Dublin and a director of the London General Omnibus Company, has been adopted as Liberal candidate for the Torquay Division.

Mr. Henry Walker, of the Hawthorns, Castle Bromwich, has been appointed a member of the board of the Metropolitan Carriage, Wagon, and Finance Company, Limited.

Mr. G. F. Nayler has been confirmed in the appointment of electrical engineer and manager of Nelson Council tramway undertaking. He was provisionally appointed a year ago.

Professor Arrhenius has been presented by the Chemical Society with the Faraday medal, the highest honour it confers, for his researches on electrolytic dissociation.

Mr. E. A. Mills, of the North Metropolitan Electric Power Supply Company, has been appointed assistant constructional engineer to Birmingham municipal electric supply department.

Mr. R. B. Holt, tramways permanent way engineer of Leeds City Tramways, has been appointed to take charge under the commercial manager of Leeds (Mr. J. B. Hamilton) of the highways department.

Mr. J. B. Sparks has resigned his position with Dr. H. F. Parshall, consulting engineer, to take up the post of chief electrical engineer to the Bergwerke und Hüttenverwaltung (G.m.b.H.), Frankfort-on-Main.

Mr. J. F. Macartney, of Malta and Southampton, a director of the Malta Tramways, Limited, and of Macartney, McElroy, and Company, left estate of the gross value of £66,028. He bequeathed £1,000 to the poor of Malta.

Mr. O. F. Francis, burgh electrical engineer, Kilmarnock, has been awarded an honorarium of £100 in recognition of his services in connection with the electric lighting extension order, and his salary has also been increased by £100 per annum.

Mr. John Harper, acting Chief Commissioner for the New South Wales railways, has been appointed permanently to the position. Mr. H. Richardson has been appointed Assistant Commissioner, and Mr. H. F. Fraser Second Assistant Commissioner.

Melbourne Railways Management.—The Victorian Railway Commissioners have denied a statement that any of them intend to retire to make room for the appointment of an experienced electric railway manager for the Melbourne suburban lines.

Mr. R. J. Fennessy has resigned the position of secretary of the Carthagena and Herrerias Steam Tramways Company as from March 1. In view of his long and valuable services, the directors have granted him a retiring allowance of £200 a year.

Mr. J. W. Horton, of Walsall, has been selected by York Tramways Committee for appointment as traffic superintendent at the commencing salary of £156, rising at the end of the first year by £4, and thereafter by annual increments of £5 to the maximum salary of £175.

Mr. Darwood, a member of the firm in Rangoon who act as local agents to the Rangoon Electric Tramway and Supply Company, is on a visit to England. He attended the annual meeting of the shareholders on May 6 at the company's offices, 3, Great Winchester Street, E.C.

Mr. J. A. Panton, general manager and director of the National Rail and Tramway Appliances Company, Liverpool, has resigned his position as general manager, but remains a director of the company. Mr. Panton is proceeding on a visit to Canada, where he is interested in a similar business.

Mr. F. de Witt, a draughtsman in the tramways department of the London County Council, is a lieutenant in the Royal Field Artillery of the Territorial Force, and recently underwent an obligatory course of instruction lasting 24 days. The Council have decided to pay his salary for that period.

Mr. R. O. Parker, formerly of the Great Western Railway general manager's office, has been appointed traffic manager of the Asunçion Tramway Light and Power Company at Asunçion. He was connected with the Great Western Railway for five years, and subsequently with the Entre Rios Railway for two years.

Increases of Salary at Liverpool.—The Tramways Committee have recommended the following increases: Mr. T. Ridyard, rolling stock superintendent, from £350 to £400 per annum; Mr. T. Blaney, mechanical and electrical engineer, from £230 to £250; Mr. R. Roulston, depot inspector, from £220 to £230.

Mr. F. Harding, general manager, Derby Corporation tramways, has received an increase of salary from £300 to £350. Councillor Dean, in proposing the Tramways Committee's recommendation, said that since 1906 the receipts had gone up from £34,200 to £51,000. Mr. Harding was a painstaking and hard-working official, and he should be treated accordingly.

Mr. Washington Hall has been presented by the members of the Potteries district of the British Electrical Friendly Society with an oak bureau in recognition of his services as secretary. The presentation was made by Mr. Cornwallis West at the annual dinner, at which Mr. W. Thom, general manager of the Potteries Electric Traction Company, presided.

Swansea Directors and Manager.—At the Swansea Tramways Company's annual meeting the remuneration of the directors was fixed at £500 per annum. The chairman observed that for the results achieved they were largely indebted to the zealous and capable management of their general manager, Mr. David James, whose efforts were ably seconded by a loyal and efficient staff.

Railway General Managers' Conference.—Sir Robert Turnbull has been elected a member of the Council of the Railway Companies' Association as successor to the late Sir Frank Ree. Mr. H. W. Thornton, as representative of the Great Eastern Railway, has succeeded Mr. W. H. Hyde, and Sir Robert Turnbull has succeeded Sir Frank Ree as representative of the London and North Western Railway.

Lisbon Tramways Management.—In their annual report the directors of the Lisbon Tramways Company refer with deep regret to the death of the general manager, Mr. A. S. Giles. Mr. A. O. Kolkhorst has been appointed to the post of general manager and chief engineer thus rendered vacant. He was previously general manager of the Chilian Electric Tramway and Light Company in Santiago, and comes to the company with great experience in tramway management.

Mr. Valentine Brown, general manager of La Plata Electric Tramways Company, is expected on a visit to London during the coming summer. At the annual meeting of the company Mr. W. F. Hamilton, K.C., the chairman, stated that under Mr. Brown's able management the cost of current in 1913 worked out at 2·02d. per car-mile run, notwithstanding the increased cost of coal, as compared with 2·19d. in 1912, and he had succeeded in training the motormen to reduce the consumption of current by judicious handling and running of the cars.

Mr. W. G. Snell, the manager, and the staff of Perth Corporation tramways, were congratulated by Ex-Bailie Calderwood, the chairman of the Tramways Committee, at the employees' annual social gathering. The Corporation, he said, had every reason to be proud of the staff and their manager, and he did not believe there was another system which had passed through the year with so small a claim against it, showing with what care all the departments were managed. In reply, Mr. Snell referred to the energetic way in which Mr. Calderwood had assisted him personally, and the department as a whole.

Mr. W. McHugh has been entertained at dinner by the office, electrical, and traffic staffs of Dublin Tramways Company, to mark his promotion to the post of chief accountant to the company, with which he has been connected since 1886. In proposing the health of the guest, Mr. R. S. Tresilian, the secretary, said that his duties were always discharged in the most efficient manner, and when emergencies arose he could always be relied on to step into the breach. Mr. McHugh, in reply, said it was a source of gratification to find that he had merited the good opinion of Mr. Tresilian and, through him, of the directors.

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Tribute to the Hastings Tramway Management.—Mr. G. Kitchin, chairman of the Hastings and District Tramways Company, in his remarks at the annual meeting, mentioned with regret that the general manager, Mr. T. B. Holliday, had been seriously ill during the season, and the board gave him a long holiday in order that he might recover his health. During his absence Mr. Edwards, who had charge of the power-station, had carried on the work, and was appointed deputy-manager for that purpose. The company was, at the Hastings end of it at any rate, well managed, and the shareholders would like these gentlemen to know that they felt they did their work well.

Sir George White, the chairman of Bristol Tramways and Carriage Company, began his career as a lad in the office of the solicitors to the company, and on the advent of electric traction he took the leading part in introducing it into the metropolis, Dublin, Bristol, and other places. He was 33 years of age when the Bristol Company was started, and he founded the firm of George White and Company, which attained a world-wide reputation. By the addition of road motor vehicles to the Tramway Company's undertaking, the company has a monopoly in the running of omnibuses and cabs in Bristol and district. The company also does an extensive business in char-a-bancs traffic.

Mr. A. H. Stanley, managing director, was presented at the annual dinner of the official staff of the London Electric, Central London, and City and South London Railways with a bowl as a token of appreciation by all grades of the granting of free passes over the railways under his control. Through the board also they have been granted privilege tickets on the London and North Western Railway. In returning thanks, Mr. Stanley said it was great delight to him to receive words of praise for their undertakings from visitors from other countries who came to inspect them. Whatever words of praise they secured was because the work that each officer was doing was reflected in the conduct of the men working beneath them. It was his greatest ambition that every employee should say he always got a square deal from the officials.

Leeds Appointments.—The City Council have adopted the General Purposes Committee's recommendations for transferring certain work of the Highways Committee to the Tramways and Electricity Committee, and the duties of the Sub-Sanitary (Cleansing) Committee to the Highways Committee, which in future is to be called the Cleansing Committee. The following appointments have been made: Mr. R. B. Holt, tramways permanent way engineer, to also take charge (under the commercial manager) of the highways department, at a salary of £400 per annum, with Mr. J. Buckley as general outside superintendent, at a salary of £250 per annum, and Mr. E. W. Cockerlyne as surveying assistant at £215 per annum; the commercial manager to be superintendent of cleansing, and Mr. H. Smith, an assistant in the tramways department, to be principal assistant under him at £200 per annum.

Directorate of the Anglo-Argentine Tramways.—In proposing the election of three gentlemen to fill the places of directors who had passed away, Mr. J. B. Concannon (chairman) at the annual meeting, mentioned that the first, Mr. Leon Cassel, was a partner in an important banking firm in Brussels, and he represented a large shareholding there. Mr. W. F. Hamilton, K. C., had been associated with him (the chairman) for 14 years in the direction of tramways in various parts of the world, and he was recognised as being one of the best experts in Argentine law in this country. Mr. G. A. Touche was the head of an eminent firm of accountants, and a gentleman of his knowledge and professional experience was of the greatest advantage in dealing with the mass of figures they had to deal with. Mr. Touche also had the advantage of having been connected with tramways for many years, and he was chairman of the Monte Video Tramways Company.

Mr. H. Holliday has been presented with a framed photographic group of the officers and employees of Torquay Tramways Company on his departure to take up the appointment of manager and engineer of the Rhondda Tramways Company. The presentation was made by the Rev. Canon Bevan, at St. Anne's Institute. Mr. Bevan remarked that Mr. Holliday had been with them for seven years, and it did not seem very long ago since he had the honour of representing them in presenting a wedding present to Mr. Holliday. He could speak for himself as well as them when he said they would very greatly miss Mr. Holliday, who had been a very kind friend to him. In response, Mr. Holliday thanked the donors and the Canon, and said his seven years at Torquay had been most happy ones. It had been hard work for all of them, and he could not possibly have had a staff of men who could have backed him up, under all circumstances, better than they had. The company they represented had now reached a stage when it might be called prosperous, and the prosperity of the company had, on occasions, been put down to his credit. But the credit was not his. It was due to the work of the men under him. He asked them to support their next manager in the same way in which they had supported him. Musical honours were accorded to Mr. Holliday, and on behalf of the staff, Mr. O Parker, shed superintendent, wished him every success and happiness in his new undertaking. Other officials present included Mr. Kelso, assistant engineer, and Chief Inspector Hawkins.

Rhondda Company Presentations.—On behalf of the staff and employees of Rhondda Tramways Company, and a number of friends, Mr. G. Rodey, the traffic manager, on May 8 presented a silver rose bowl to Mr. H. J. Nisbett, general manager and engineer, on his departure for Torquay tramways. Referring to Mr. Nisbett, the chairman said he had been more than a manager; he had been more a friend than a chief. Their present would be always before him, as Mr. Nisbett was a great lover of flowers. In responding Mr. Nisbett said the rose bowl was the best he had ever seen, and would serve to remind him of the friends he had made. Speaking from 30 years' experience of business life, and alluding to his friendship with the staff, he said a manager was much more likely to get a man to do his best if he left him alone after telling him what he required, instead of worrying him. Mr. Nisbett added that he was pleased that the little training given to the men had been instrumental in several cases of securing for them bigger and better jobs elsewhere. Many of the younger men who would take their places would find the Rhondda an excellent training ground, although the amenities of life in the district were not such as a man could get much enjoyment out of them. Mr. R. G. Rees, overhead superintendent, was presented by Mr. Nisbett, on behalf of the employees, with a purse of gold on his departure for Bolton. He had already a cigarette case and a silver mounted stick from the Pontt Fire Brigade. Mr. Rees suitably responded.

Mons. A. Mariage, Directeur Général, Compagnie Générale des Omnibus de Paris, has been retained by the London County Council to advise them with regard to the various phases of the problem of consolidating and linking up of the Council's tramways. M. Mariage had had unique experience inasmuch as he was responsible, the committee said, for both tramway and omnibus services. He had also had to deal with the problem of "dead ends." M. Mariage rendered considerable assistance to the Council in connection with the running of trail cars and sent one of his assistants to give evidence in support of the Council's application to Parliament for powers in respect thereof. M. Mariage will receive a personal fee, including all travelling and hotel expenses, etc., of £250, and a fee of £75 will be paid to an assistant to accompany him to London, to act as his interpreter, and to translate all documents into English. M. Mariage is an electrical engineer, and he was chosen by the Paris Compagnie Générale to reorganise the whole system of tramways and omnibuses when the concessions then held by three companies were renewed and remodelled in 1910. It is stated that M. Mariage views the London proposal as a great compliment, and for that reason has accepted a nominal fee. The Paris tramways are being extended to the centre of the city to such points as the Place de l'Opéra and the Madeleine, and it is presumed that when the lines are opened the motor omnibus service will be curtailed.

Mr. W. Glendinning, who for 40 years was cashier in the office of the Belfast tramways, has died in that city. He retired about a year ago.

Mr. J. Kneeshaw, tramway traffic superintendent at Sydney, died on March 16. He had just entered upon six months' leave of absence prior to his retirement from the service.

Mr. J. Richardson, J.P., for many years a member of the firm of Liverpool solicitors, a director of the Liverpool Tramway Company, who died on March 16 last, aged 79 years, left estate of the gross value of £29,339, of which £27,393 is net personalty.

Mr. George Conaty, consulting engineer, of Birmingham, has died at a sanatorium in Berkshire. Until six years ago he was manager of the Birmingham Tramways Company, which then operated 105 route-miles in the city and district. He received his technical training in Leeds, and he had served as engineer to the Dublin and Lucan Light Railway, engineer to the Birmingham and Midland Tramways Company, manager to the South Staffordshire Tramways Company, and manager of the Birmingham Tramways Company. Upon the system being taken over by the Corporation he began practice as a consulting engineer, and was greatly esteemed in the city and the Midlands.

Ticket Offices for Passengers.—Mr. A Wilkie, the manager of Aberdeen Suburban Tramways Company, has completed the arrangements for the summer's traffic, in which the use of petrol-electric omnibuses is to be a development. Ticket offices will be erected at Mountfield and Bieldside to enable passengers to secure tickets before boarding the cars.

London County Council Tramways Power-station.—Mr. G. H. Hume, chairman of the Highways Committee of the London County Council, on May 27 inaugurated the working of the first of the 8,000-kw. steam turbines at the power-station at Greenwich. Four of these turbines are being installed to provide for the increased demand for power by the tramway system, and to avert an entire suspension of traffic in the event of a breakdown.

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CONTRACTS AND ORDERS.

General Electric Company have received a contract from Walthamstow Council for Osram drawn wire lamps.

Aberdeen Council have placed an order for special trackwork with Edgar Allen and Company, Sheffield, £1,063.

Hadfields, Limited, have received an order from West Hartlepool tramways for the supply of points and crossings, at £176.

F. Smith and Company, Halifax, have received a contract from Ilford Urban Council for the supply of two miles of trolley wire, at 8⅝d. per lb.

Cars for Johannesburg.—Orders for 15 car bodies and trucks have been placed in the United Kingdom by Johannesburg tramways department.

C. A. Parsons and Company have been awarded a contract to supply a 2,000 KW. turbo-alternator and condensing plant to Portsmouth Council, at £7,179.

J. W. Courtenay, Limited, have secured a renewal of their lease of the exclusive rights of advertising on the Scarborough Tramway Company's cars.

Mr. John Taylor, of 7, Strand Street, Liverpool, has received an order for 100 Taylor's patent tubular sand controllers from Blackpool Corporation Tramways.

Walter Scott, Limited, of Leeds, have received a contract to supply rails for the extension of the Doncaster Council tramways to Warmsworth, at £8,312.

Liverpool Tramways Committee have purchased an electric battery wagon, on the recommendation of the electrical engineer, for the electricity department.

Belfast Council have accepted the tender of Dick, Kerr and Company for the construction of permanent way of the tramways during the year ending March 31 next.

British Thomson-Houston Company have been awarded the contract for supplying two 180-KW. generators for sub-stations at Leigh and Thorpe Bay, for £752.

Birmingham Council have accepted an offer from the City Electrical Department to provide two electrical battery vehicles for the removal of street refuse as £550 each.

Devonport Council have accepted the tenders of Jas. Howden and Company, for a 1,250-KW. Howden-Siemens turbo-alternator, and of Bruce Peebles and Company for motor converters.

Portsmouth Tramways Committee have reported in favour of purchasing two 30-H.P. "X" type of chassis, for use as a tower wagon and lorry respectively, from the London General Omnibus Company.

J. H. Tucker and Company, of Hay Mills, Birmingham, have received from Sunderland Corporation tramway department a contract for the supply over the next 12 months of their requirements in lampholders.

Siemens Brothers Dynamo Works, Limited, have received an order from London County Council to re-wind the armature of one of their motor generators at Clapton sub-station, which was supplied by the company in 1906.

Bradford Council have placed a contract with the Phœnix Dynamo Manufacturing Company for the supply of three motors required for driving the new induced draught fans to be installed at Valley Road generating station, at £1,087.

Halifax Council have placed a contract with the British Thomson-Houston Company, Limited, for 1,000-KW. rotary converter, with transformer and e.h.t. switch gear, at £2,100; and with Babcock and Wilcox, Limited, for water-tube boilers, at £2,400.

Stratford Co-operative Society are working a 2-ton Edison electric van. Charging is given at the West Ham Corporation electricity works. It is stated that the Society are considering the advisability of purchasing additional electric vehicles.

Warrington Council have placed contracts with the British Westinghouse Company for a rotary converter at £1,537; with the British Thomson-Houston Company for switchboard panels at £581; and with the General Electric Company for a switchboard extension.

R.E.T. Construction Company, Limited, have received an order from Ramsbottom Urban Council for the supply of two railless trolley cars, complete with wheel-guards and side-guards, and wheels fitted to take 40-in. diameter tires; and for new wheels and springs for the old cars.

Gloucester Council have placed a contract with the British Insulated and Helsby Cables for cables at £630. Among the tenders for annual supplies to the electricity and light railways department which have been accepted is that of the Tyne Metal Company, for brake blocks.

Simplex Rubber Company have received an extended contract from Southend Council for the maintenance of the rubber tires of two motor vans in the highways and works department at a charge of 1⅜d. per mile run, the agreement to be subject to three months' notice.

Royal Ediswan Lamps.—The Edison and Swan United Electric Light Company, Limited, have received through a Dublin firm of contractors an order for over 2,300 Royal Ediswan drawn wire lamps for Maynooth College, which is at present changing to metal lamps.

United Electric Car Company have received a contract to supply 14 top covers for tramcars to Huddersfield Council. The company's tender for the supply of three toast-rack car bodies has been recommended for acceptance of Southport Council.

Prahran and Malvern Tramways Trust have placed a contract for the supply of points and crossings with Edgar Allen and Company, Limited, at £2,687, and for overhead materials and cables with the British Insulated and Helsby Cables, Limited, at £3,995. Tenders are to be invited for the supply of 25 cars.

Manchester Council have awarded contracts as appended: Two sets of soot cleaning apparatus, British Vulcan Soot Cleaner Company, Limited; low-tension switchboard for Stuart Street station, Edison and Swan Company, Limited; cable, Western Electric Company, Limited; high-tension sub-station switchboard, Electric Construction Company, Limited.

Post Office Experimental Railway.—In connection with the scheme for the construction of an underground electric railway for the conveyance of mails in London, the Postmaster General has placed the following contracts for an experimental line to be constructed at Woolwich: Electric conductor rails and electric motor wagons, Dick, Kerr and Company, Limited.

Burnley Council have accepted tenders as subjoined: British Thomson-Houston Company, electric motors and starters; Phœnix Dynamo Manufacturing Company, two motor-driven pumps, £445; Dorman Long and Company, Limited, steel girders for foundations of the new central station plant, £70; Galloways, Limited, Lancashire boiler, £555; Siemens Brothers, cable, £150.

The Motor Rail and Tramcar Company, Limited, have received an order from the South Indian Railway Company, Limited, for three "Simplex" rail coaches. Each coach will have seating for 70 passengers, be 40 ft. long over headstocks, and be propelled by a 45-H.P. motor in conjunction with a "Dixon-Abbott" gear box affording three speeds in both directions, operated from either platform. These coaches are capable of a speed of 25 miles per hour.

The Railway Track Supply Company, of 79½, Gracechurch Street, London, E.C., have received an order from the Great Western Railway Company for six "Edison-Buckwalter" electric trucks. This is the fourth order placed by this railway for "Buckwalter" trucks since September last. We understand the Great Western Railway intend to employ the trucks just ordered for railway platform service. "Edison-Buckwalter" trucks are now being used for this purpose by a number of railway companies, etc., in this country.

Salford Council have accepted the following tenders: British Westinghouse Electric and Manufacturing Company, three 1,000-KW. compound-wound rotary converters and static transformers, £7,388; Edison and Swan United Electric Light Company, supply and erection of two h.t. distribution switchboards and 12 oil switch cubicles, £343; J. Hopkinson and Company, seven Hopkinson-Ferranti steel parallel slide valves, £136 10s.; Vaughan and Son, supply and erection of a 10-ton hand-operated overhead travelling crane, £115.

Albion Motor Car Company have received an order from West Bromwich Corporation for four 25-H P. Albion chassis, with a seating capacity of 24 passengers each. Other orders recently received include among others, the following: 32-H.P. 3-ton Albion for W. F. and J. Worley, carriers, London; this is a repeat order, and the firm now have three Albions in constant use. Two 32-H.P. 3-ton Albions for Sutton and Company, carriers, Manchester; this order increases the fleet of this company to 16. One 16-H.P. 25-cwt. vehicle for T. Wallace and Company, carriers, London, who have already four Albion vehicles. A repeat order has been received from the India Rubber, Gutta Percha and Telegraph Works Company for one 15-H.P. 20-cwt. van.

Glasgow Council have accepted the tender of the British Thomson-Houston Company for three 1,900-KW. rotary converters, at £6,472, and of the British Westinghouse Company for three 500-KW. rotary converters, at £3,799. The following tenders for supplies to the tramways department during the ensuing year have been accepted:

Steel forgings for car trucks, Brush Electrical Engineering Company; steel wheels, John Baker and Company, Limited; steel tires, Brown Bayley's Steel Works, Limited; steel axles, Glasgow Railway Engineering Company, Limited; bolts and nuts, Rivet, Bolt, and Nut Company, Limited, and P. and W. MacLellan, Limited; chilled-iron brake bolts, Miller and Company, Limited; iron castings, R. Howie and Company, James Allen, sen., and Son, Limited, and David King and Son; steel castings, Dickson and Mann, Limited, and Carntyne Steel Castings Company, Limited; malleable-iron castings, Alex Shanks and Son, Limited; rubber and asbestos goods, North British Rubber Company, Limited, Rubber Company of Scotland, Limited, J. T. Goudie and Company, and Geo. M'Lellan and Company; springs, G. Turton Platts and Company, Limited, and L. Sterne and Company, Limited; W.I. tubes and fittings, Stewarts and Lloyds, Limited, and Scottish Tube Company, Limited; galvanised steel wire, Wm. Bain and Company, Limited.

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Leeds Corporation have allotted the following contracts:

Dick, Kerr and Company, Limited, 100 controllers; Elliott Brothers, one 10,000-ampere ammeter; Dick, Kerr and Company, Limited, 10 electrical equipments for cars; British Thomson-Houston Company, 36 arc lamps; J. Brown and Sons, tires; Taylor Brothers and Company, axles; Hadfield's Steel Foundry Company, points; Bayliss, Jones, and Bayliss, Limited, fish bolts; Bolckow, Vaughan, and Company, fish plates; David Speight and Son, reconstruction of track; General Electric Company, Barr Brothers, Thomson-Houston Company, Tramway Supplies, Limited, Rubberoid Company, British Westinghouse Manufacturing Company, A. Thompson, L. Andrew and Company, Carl Quitman, Spicer Brothers, Limited, electrical supplies; Robert Kearsley and Company, Limited, Ripon, and other firms, paints and varnishes.

London County Council have placed the following orders and contracts: Supply of one 10-H.P. three-phase motor and one 2-H.P. three-phase portable motor required for the boiler house workshop at Greenwich generating station, General Electric Company, £100 7s.; electric lighting material required for the central car repair depôt and Abbey Wood car shed, General Electric Company, £217; lead cable sleeves for tramcar ploughs, Irwell and Eastern Rubber Company; one 6 in. screw-cutting lathe for the boiler workshops at Greenwich power-station, John Lang and Sons, Glasgow, £103 10s.; contracts with the tramways department: Portland cement, Empire Portland Cement Company, £4,790; clean river ballast, T. Scholey and Company, £1,979; clean, sharp, river sand, W. Cory and Son, £1,137; shingle, J. Wall, £2,125; iron castings for permanent way, J. Martin and Son, Lambeth, £3,388, and T. Summerson, Darlington, £3,846; steel and iron castings for permanent way, Edgar Allen and Company, Sheffield, £2,087, "M. and G." Truck and Engineering Company, 124-127, Minories, E., £801.

TRAMWAY AND LIGHT RAILWAY NOTES.

ABERDEEN.

NEW PROVISIONAL ORDER—TRIAL OF A LIFE-GUARD.

A Provisional Order of the Aberdeen Corporation has been approved by the Commissioners appointed under the Private Legislation Procedure (Scotland) Act of 1899. The Order confers powers to construct three tramway lines, to run mechanically-propelled vehicles and trolley omnibuses along certain streets; to provide motor omnibuses, and run such vehicles within the city and on one route beyond the city boundary. Powers are given to appropriate each year any sum or sums not exceeding one-third of the free surplus revenue of the tramways department, and apply the same to the common good, or towards the reduction of the city rates, or in carrying out city improvements. The tramways department are giving a trial to a new life-guard invented by Messrs. Cromarty and Stuart, of Aberdeen. The same inventors have devised a guard for road motor vehicles.

BELFAST.

BILL TO LEGALISE PROFIT SHARING—TRAMWAYS AND THE ULSTER QUESTION.

As a sequel to the recent surcharging of Belfast Corporation with the money voted to the tramway employees as a share of the profits of the tramway undertaking, Lord R. Cecil (U.) on May 7 asked leave of the House of Commons to introduce a bill to enable local authorities to share with their employees profits made by such local authorities. The bill was brought in and read a first time. In his yearly report Mr. A. Nance, the manager of the Corporation tramways, says: "In my opinion no estimate made for the ensuing year is worth the paper it is written on, having regard to the uncertainties which lie before us; and, as no statutory duty is placed upon me to make an estimate, I refrain from doing so. I am in a position, however, to say that the committee may firmly rely upon the wholehearted and loyal operation of the undertaking by their staff, without exception, and that whatever happens the tramways will go on working, if worked they can be by human power."

BIRMINGHAM.

NEW CONSTRUCTION ESTIMATES—RESERVE FUND AND RATE RELIEF—HALFPENNY FARE AND ALL-NIGHT CAR QUESTIONS—BONUSES FOR MOTORMEN.

The estimated cost of the tramway extensions just sanctioned by Parliament is £144,209, while electrical equipment will cost £34,710, and rolling stock £18,000. For the purchase of lands and street improvements the estimated outlay is £46,958. The Council have adopted the Tramways Committee's recommendations against halfpenny fares, an extension of the time of issue of workmen's tickets from 8 a.m. to 9 a.m., and a service of all-night cars. By means of a bonus system to motormen the tramways department hope to effect a considerable reduction in the amount of current consumed during the present year. Councillor Harrison Barrow, the chairman of the Tramways Committee, in moving the adoption of the annual report on May 19, informed the Council that if the cost per car-mile had been the same as in the previous year there would have been a greatly increased profit.

BLACKBURN.

EFFECT OF TRACK AND CARS ON CURRENT.

Mr. J. H. Cowell, general manager of the Corporation Tramways, in his report for the year ended March 31, states that the average energy consumption was 1·64 units, the cost being 2·14d. per unit. This represents a saving in the cost of the current on the mileage run, compared with last year, of approximately £1,100. He attributes the reduction in consumption of current to the fact that the cars and track have been well maintained. A sum of £452 has been paid in bonuses to the motormen during the year for low current consumption.

BURY.

SUGGESTED CARRIAGE OF SMALL GOODS.

The Tramways Committee on May 20 received a deputation from the Bury and District Chamber of Commerce on the question of the carriage of small goods on the cars. It was decided that the deputation should meet Mr. W. Clough, the general manager, and it was pointed out that at the congress of the Tramways and Light Railways Association in June, 1913, the question of the carriage of light goods on tramways was discussed, and on that occasion Mr. Clough suggested the advisability of forming a joint board to take up the matter.

CARDIFF.

HOME SECRETARY AND A HATPIN BY-LAW.

The Home Secretary has expressed doubt whether so wide a by-law as that submitted by the City Council with regard to hatpins could be properly made. He has suggested that the Council make an experiment of a much more restricted character—namely, that any prohibition of the wearing of dangerous hatpins should be applied to such places as tramcars, omnibuses, etc., where the danger is greatest. The letter has been referred to the Watch Committee.

DARWEN.

SEQUEL TO ENTERPRISING MANAGEMENT.

Mr. F. J. S. Hosken's first annual report as tramways manager and engineer shows a profit of £449, as against £106 the previous year. Passengers increased by 396,228, the average number of journeys per head of the population rising from 72 to 82. In addition to increasing the comfort of the passengers by renovating the cars and by other means, cheap dinner hour and return tickets have been issued. During the present year a bonus is to be given to motormen for the economical use of current. At present about 1·7 units of power per car-mile are expended, and drivers who bring the consumption down to 1·3 will receive an extra 2s. weekly. Two new cars are being purchased.

DUNDEE.

WITHDRAWAL OF RAILLESS TROLLEY CARS—PRICE FOR 1,540 YARDS OF TRAMWAY.

Owing to the poor financial return, the unsuitability of the road surface, and the refusal of the works department to bear the whole cost of putting the roadway in a proper condition, the railless trolley car service on Clepington Road has been discontinued. Mr. Fisher, the tramways manager, has been directed to report to the Tramways Committee on the sum which should be offered to the Dundee, Broughty Ferry, and District Tramways Company for 1,540 yards of line which the Council propose to take over. The company have asked for £15,480, but the Corporation tramway department can construct a mile of tramway at a cost of about £8,000.

GLASGOW.

TRAFFIC AT A LAUNCH—ROUTE NUMBERS—EXCURSIONS BY CAR.

During Sunday, May 10, morning the tramways conveyed 50,000 passengers from central points to Dalmuir and Renfrew on the occasion of the launch of the Cunard liner "Aquitania" at Clydebank. Following experiments in respect to position and the style of numbers to be used, the Glasgow tramways department have begun to equip all the cars with route numbers above the top of the panel of the vestibules. The first route will be represented by 10, and there are about 70 services. Owing to the impossibility of supplying sufficient cars for excursion parties on Saturdays the tramways department are soliciting custom for orders for special cars on other weekdays. More than two dozen cars have been booked for each Saturday in June.

HUDDERSFIELD.

DOUBLING AND NEW LINES.

The Board of Trade have given their consent to the doubling of the lines in New Hey Road, Outlane, and Longwood Road and Vicarage Road, Longwood. One or two proposed extensions are now under consideration.

HULL.

AN EXPERIMENT IN HALFPENNY STAGES.

On the recommendation of the Tramways Committee halfpenny stages are being tried experimentally for six months. Mr. W. J. McCoombe, the manager, considers the scheme to be a daring one, and the Mayor (Councillor Hargreaves) says that the undertaking has not a big margin to play upon, as the track costs £10,000 a year. The fares, the Mayor adds, will be the cheapest in the country. Transfers will not be issued after 9 a.m.

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LEICESTER.

REDUCED CHARGES FOR BOOKS OF TICKETS—AN EXTENSION—PROPOSED HONORARIUM FOR THE SURVEYOR.

It has been decided to reduce the charges made for books of tickets as follow: 7 tickets for 6d., 14 for 1s., and 28 for 2s. At a cost of about £20,000 an extension of the tramways is to be made from Walford Road to Clarendon Park, thus catering for traffic on the east side of the cattle market and the cemetery. On the Tramways Committee's recommendation the Council have granted a sum of £500 to the borough surveyor as an honorarium for special services rendered in connection with the construction of the tramways.

LONDON.

TENDERS FOR 150 TRAIL CARS—PREPARING FOR LONDON COUNTY COUNCIL AND LONDON UNITED TRAMWAYS THROUGH RUNNING—SUCCESSFUL PARLIAMENTARY APPLICATIONS—PARIS MANAGER TO ADVISE ON LINKING UP—BREAKDOWN OF VEHICLES BY-LAW.

Early in May the Board of Trade agreed to the running of trail cars on nine routes, covering practically the whole of the London County Council tramways south of the river. The trail cars may now be run at all times, with the exception of Sundays, Bank Holidays, and public holidays between 12-30 a.m. and 10 a.m., and Mondays, Tuesdays, Wednesdays, Thursdays, and Fridays between 10 a.m. and 4 p.m. Tenders are invited by the County Council for the supply, delivery, and maintenance of, alternatively, at the discretion of the Council, 50, 100, or 150 complete trail cars, and the equipment of 200 existing motor cars with couplers and traction gear for drawing trail cars. During the month of May the department carried out the construction of a double line junction from Mitcham Road to Tooting High Street. This will give communication from districts on the Embankment-Brixton line with the Tooting terminus of the London United Tramways Company, and when the projected arrangements for through running are completed a considerable excursion traffic to Hampton Court might be worked up by judicious advertising. Following the sanction to the abolition of the Aldgate terminus by the construction of a line round Trinity Square, which is adjacent to the Tower, a House of Commons Committee on May 11 approved of the linking up by an overhead trolley line of the Eltham Road line to join the Well Hall line from Woolwich. Some of the frontagers opposed the application, and their counsel admitted that the expenses of their opposition were to be paid by the London Omnibus Owners' Federation. The Committee also sanctioned a clause which empowered the Council to work two lines at Hammersmith which they are taking over from the London United Tramways Company. The company had petitioned in order to obtain running powers, but it was announced that the petition would be withdrawn without prejudice to the company's rights in the House of Lords, in the belief that an arrangement would be arrived at. The County Council on May 12 approved of the recommendation by the Highways Committee to consult Monsieur A. Mariage, Directeur Général, Compagnie Générale des Omnibus de Paris, in the matter of the consolidation and linking up of the tramways. M. Mariage has had unique experience inasmuch as he is responsible for both tramway and omnibus services, and has had to deal with the problem of dead ends. After two postponements to enable objections to be considered, there came into force on May 13 a by-law made by the County Council in November last under which a fine not exceeding 40s. can be imposed in cases of a defective or overloaded vehicle breaking down and causing obstruction in the street or public place.

MANCHESTER.

POST OFFICE CLAIM—CAR NUMBERS.

An unsuccessful claim has been made in the County Court by the Postmaster-General against the Corporation for damage caused to a pillar box. It was alleged by counsel for the plaintiff that the driver of a tramcar tried to pass before the trailer of a motor wagon had got clear of the line. The result was that the wagon was driven against the box. Counsel read a section of the Telegraphs Act to show that in regard to damage done to Post Office property it was not necessary to prove negligence. Judge Mellor said there was no evidence of negligence, without which he could not see how the Post Office could succeed. Judgment would be given for defendants. For several months tests of various types of numbers which can be illuminated at night have been made by the tramways department. All the cars on the various routes are now being numbered, the screen being placed under the destination box.

MORECAMBE.

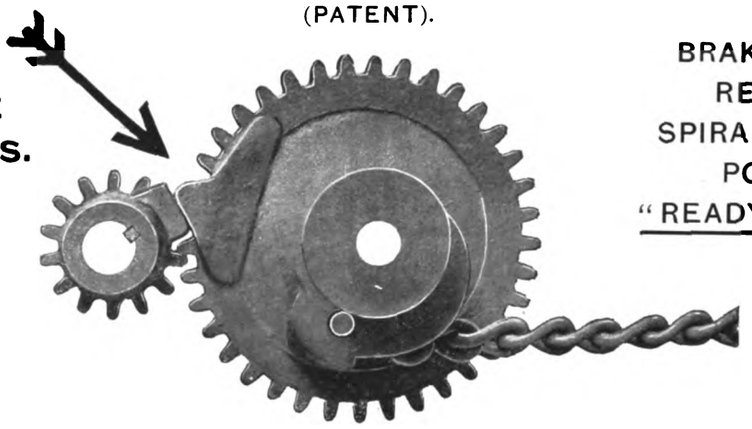
THE ELECTRIFICATION QUESTION.

At a special meeting of the Town Council the Tramways Committee were directed to report at an early date on the question of electrification, after obtaining information about all systems. The Committee already possess a report prepared by the late electrical engineer (Mr. L. B. Hogarth) showing the relative cost and estimated profits of four different systems—the conduit, the accumulator, petrol or petrol-electric, and the overhead trolley system.

The "PEACOCK" IMPROVED BRAKE

(PATENT).

THE STOPS.



BRAKES FULLY RELEASED SPIRAL DRUM IN POSITION "READY TO WIND."

IT'S SO SIMPLE!

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NEWCASTLE-ON-TYNE.

HIGH LEVEL BRIDGE TRAMWAY SCHEME—MORE NOTICEABLE TICKET BOX—HATPINS.

In consequence of the rejection of the North Eastern Railway Company's trolley car scheme for the High Level Bridge, the Tramways Committee of Newcastle have decided to seek power to extend their lines over the bridge. The Corporation objected to the railless trolley car project on the ground that they were the tramway authority for Newcastle. Before the Parliamentary Committee the Railway Company's chief engineer, Mr. C. A. Harrison, said he could not see how the bridge could be strengthened to carry tramcars unless it was rebuilt, but counsel for the Corporation offered evidence of Sir Maurice Fitzmaurice to the effect that there would be no difficulty in making the bridge capable of carrying the tramway without detracting from its appearance. The Tramways Committee are giving consideration to a more prominent ticket box than those used in the past, and also to the question of displaying warnings regarding the use of dangerous hatpins.

NOTTINGHAM.

MERIT GRADE SCHEME REPLACES BONUSES—TWENTY NEW CARS.

Mr. J. Aldworth, general manager of the Corporation Tramways, mentions in his annual report that the payment of bonuses to drivers and conductors for economy in the consumption of power was withdrawn on December 31, and a merit grade was adopted in its place. This resulted in an immediate increase of wages of £1,265 per annum. The scheme has worked quite smoothly and appears to have given general satisfaction. Eight of the 20 new cars which were ordered by the Corporation tramways department have been delivered by the Brush Engineering Company. The platforms are fitted with glass fronts.

PLYMOUTH.

THREE TOWNS AMALGAMATION AND THROUGH RUNNING—TRACK RENEWALS.

In connection with the approval by the Local Government Board of the amalgamation of Plymouth, Stonehouse, and Devonport, the Amalgamation Sub-Committee of Plymouth Council have issued a report in which they claim that they proved the public had been deprived of the facilities which the three tramway systems could give owing to the divided counsels and conflicting policies of the three towns. Through running, the report adds, is estimated to yield an additional profit of at least £7,000 a year. Mr. C. S. Hilton, chairman of Devonport and District Tramways Company, alluded to the question at the company's annual meeting on May 21. The directors, he said, had approached Plymouth more than once on the subject, and he hoped that through running would become an accomplished fact before long. Mr. E. R. Soames, a director, added that he knew of no reason why through running should not take place immediately. The secretary of the company has informed Devonport Council that an expenditure of over £3,000 upon renewals, apart from the ordinary repairs, during the current year has been authorised.

STOKE-ON-TRENT.

TERMS FOR AN EXTENSION OF THE COMPANY'S LEASE.

By 33 votes to 27 the Corporation, on May 21, rejected an amendment for the deletion of the Tramways Committee's recommendation to extend until December 31, 1940, the lease of the tramways to the Potteries Electric Traction Company. An amendment that a poll of the ratepayers be taken was also defeated, and the committee's report was adopted. The principal conditions, which are to be placed before the company for their consideration, are that the company should pay the Corporation a wayleave of £2,000 a year for the first 13 years, and £3,000 a year for the remaining term of the new lease; and that the tramway company shall carry out improvements to stock and permanent way at an estimated cost of £35,000. The company will also be asked to undertake not to oppose any application made by the Corporation to Parliament for powers to run motor omnibuses or other system of traction. A penalty of £1,000 is also provided for a breach of any of the covenants of the agreement. Replying to a suggestion that the Council should wait and see the effect of the competition of the motor omnibuses recently introduced by the Greater Omnibus Services, Limited, the Mayor said it would not be a useful expenditure of public money to take over the system. There was a likelihood, he thought, that electric traction would be superseded by other modes of traffic.

SUNDERLAND.

TOP COVERS FOR THE CARS.

The Tramways Committee have recommended that top-covers be placed on all the cars with the exception of 10. As for six of the cars of a certain type a covered top would be too heavy for the existing machinery, the committee propose to provide new trucks and equipment for these cars, the old trucks and equipment to be supplied with ordinary bodies.

PATENT LIST.

Specially abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given below in italics.

APPLICATIONS.

The following Applications for Letters Patent have been filed:

10,323 Gauge bars for railway points—L. W. Williams.
10,350 Electrical apparatus for stopping trains—B. H. Thrupp.
10,363 Springs of rolling stock, motor vehicles, etc.—G. S. Russell.
10,435 Electric railway signalling—A. J. Downes.
10,531 Electric motor control systems—British Thomson-Houston Company, Limited *(General Electric Company)*.
10,532 / 10,533 Alternating-current track signalling—B. H. Peter.
10,534 Electric points or signal actuating mechanism—B. H. Peter.
10,554 Lubricator for locomotive engines—A. Hamilton.
10,617 Means for preventing the creeping of rails—A. Rambacher.
10,619 Electrical system for transferring cars—T. F. Mullaney.
10,632 Frogs used in connection with tramcars—C. Morgan.
10,692 Device for automatically adjusting railway brakes—E. Bora.
10,720 Steam superheaters for locomotive boilers—J. G. Robinson.
10,721 Steam superheaters and feed-water heaters—W. H. Tinson.
10,742 Electro-magnetic train stops—J. Doyle.
10,859 Controlling devices for locomotive cylinders—H. A. Stenning and Schmidt's Superheating Company, Limited.
10,892 Automatic car couplings—C. H. Stark.
10,938 Railway traffic controlling devices—A. E. Alexander *(Union Switch and Signal Company)*.
10,948 Electric railways—C. M. White *(M. E. Sturges)*.
10,957 Axle bearing for railway vehicles—E. Zechmeister.
11,027 Railway control and protective systems—A. Gollos.
11,203 Apparatus for operating railway points—F. Swales.
11,221 Railway vehicle axle boxes—J. Pettigrew.
11,237 Compressed air brakes—F. J. Chapsal and A. L. E. Saillot.
11,261 Railway signalling—T. Pugson, E. Pugson, and E. Pugson.

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11,265 Method of placing the trolley poles of tramcars on the overhead wire—G. E. Watmough and W. J. Smith.
11,309 Supports for overhead conductors for electric railways—British Westinghouse Electric and Manufacturing Company, Limited (*Westinghouse Electric and Manufacturing Company.*)
11,312 Electric brakes for railways—C. W. Paget and J. Dalziel.
11,343 Supporting and insulating conductor rails of electric railways—E. P. B. Estler.
11,353 Regulation or control of railway traffic—H. Von Kramer.
11,355 Points for tramways, railways, etc.—Edgar Allen and Company, Limited, and E. Larmuth.
11,372 Actuating signals on locomotives by electro-magnetic induction—G. Kapp.
11,373 Life-guard for motor omnibuses—A. E. Merry.
11,403 Clamping railway rails in alignment—J. S. Wait, junr., and A. Halliday.
11,434 Automatically-actuated fare registering or recording—S. G. S. Dicker (*P. P. Lockling Improved Automatic Passenger Fare Registering Company*).
11,485 Life-guards for omnibuses, tramcars, etc.—S. H. Burrows.
11,516 Electric control apparatus for signalling systems—A. D. Cardwell.
11,538 Wheel fenders for railroad trucks—H. J. C. Forrester (*T. B. Gates*).
11,583 Rail joints—C. C. Williams.
11,602 Fish plate for temporary track construction—J. T. Chapman (*J. Rundgren*).
11,630 System for signals and motor control for electric roads—R. V. Collins.
11,637 Tramway and railway points—H. Bradley and J. Fish.
11,715 Railway signalling—Siemens Bros. and Company, Limited, and J. Boot.
11,739 Insulating devices for electric traction systems—British Thomson-Houston Company (*General Electric Company*).
11,802 Automatic train stop—W. K. Howe.
11,912 Life-guard and automatic brake for omnibuses—F. P. Bourn.
11,913 Rail joint on one joint sleeper—G. H. J. Maas.
11,915 Railway signalling devices—J. P. O'Donnell.
11,919 Suspension devices for rolling stock—Soc. Anon. Brevetti Caldaie a Vapore.
11,940 Electric signalling installations—Siemens Bros. and Company, Limited (*Siemens and Halske Akt.-Ges.*).
11,947 Crank axles for locomotives—T. Matthews.
12,047 Self-propelled vehicles—British Thomson-Houston Company, Limited (*General Electric Company*).
12,084 Railway safe-running devices—A. R. Angus.
12,150 Dynamo and system of electric lighting for trains—H. Leitner.
12,191 Electric lighting, heating, and ventilating of railway carriages—T. Ferguson and J. R. Johnstone.
12,213 Life-guard for motor omnibuses—R. Gibson.
12,263 Station indicating apparatus—W. A. Minchin.
12,292 Brake blocks for tramcars—J. H. Jones.
12,331 Railroad ties—C. L. Seyler and F. E. Seyler.
12,443 Insulator for the overhead conductors—F. Libano.
12,510 Automatic control of trains—E. Ramsden.
12,662 Construction of apparatus for automatically controlling locomotives or electric motors when passing signals at danger or rounding curves—W. C. Minifie and J. H. Barclay.
12,721 Electrical signalling—W. A. Heyes and L. O. Heyes.
12,733 Railway rolling stock—N. H. Babson and A. F. Pittee.

Specifications Published.

1913.

8,249 Signalling and the control of trains—Marks (*Mascarenhas.*)
14,200 Life-guard for motor omnibuses—Beston.
14,292 Devices for use in controlling railway track points, signals, etc.—Bell and Maguire.
14,362 Car coupling—Rison.
14,446 Apparatus for cutting or lowering the check rail on tramways, railways, etc.—Stirk.
22,754 Railway track crossings—Cobb.
22,755 Railway track crossings—Cobb.
12,080 Car trucks—Adams.
15,538 Wheel-guards for motor omnibuses—Gumbrecht.
24,921 Railway rail joints—Reinhart.
10,275 Life-guards for motor omnibuses—Harris and Howe.
22,127 Electric switches for railways—Soc. d'Electricite Mors.
22,386 Signalling and controlling locomotives—Partington.
27,640 Rail joints—Slater.

1914.

4,523 Suspension and tension arrangements for electric trolley wires or contact lines—Siemens-Schuckertwerke Ges
7,439 Means for attaching guide rails to transverse sleepers—Pasel.

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"Past results have been so satisfactory that we have this year decided to place the whole of our order in your hands."

The Peckham Truck and Engineering Company, Limited, of Queen Anne's Chambers, Westminster, S.W., has been organised to take over the business of the Peckham Truck Company. The chairman of the new company is Mr. G. Pauling.

TRAFFIC RETURNS.

Colonial and Foreign Tramways.

NAME OF COMPANY.	1913. WEEKS ENDED.					1914. WEEKS ENDED.					AGGREGATE.		
	May 3	May 10.	May 17	May 24.		May 2.	May 9.	May 16.	May 23.		Wks.	1914.	Increase or Decrease.
	£	£	£	£		£	£	£	£			£	£
Anglo-Argentine	52.834	58.781	57.156	58.260	...	58.772	52.697	55.368	55.557	...	21	1,182.272	+ 6.986
Auckland ... ... (28 days)	...	21.662	...	...	...	...	22.268	...	...	...	44½	226.392	+ 5,419
Brazilian Street ... (month) Mrs.	44,765	...	...	...	...	50.595	...	...	...	...	39	473.635	+ 71,209
Brazilian Traction	88.084	93.378	92.292	91.959	...	90.000	94.734	95.400	93.666	...	21	1,983.669	+ 82.256
Brisbane ... ...(month)	25.390	...	...	...	...	28.610	...	...	...	...	17	110.525	+ 11.095
British Columbia ... (month) $	706.633	..	...	...	...	698.508	...	...	...	...	43	7,450.590	+341.036
Buenos Aires Port and City (month)	6.659	...	...	...	...	6.428	...	...	...	...	17	29.804	+ 3,418
Buenos Ayres Lacroze ...(month)	44,215	...	...	...	...	43.411	...	...	...	...	43	445.536	+ 6,311
Calcutta ... ... Rs.	62,382	62.256	60.060	62.174	...	65.680	67.986	62.722	63.910	...	21	14,12.054	+ 65.852
Cape Town ... ...(month)	12,175	...	...	...	...	13,408	...	...	...	...	17	55.388	+ 3.926
Carthagena and Herrerias (month)	...	...	...	...	...	...	...	...	...	...	—	—	—
Cordoba ... ...(month)	...	...	...	...	...	...	...	...	...	...	—	—	—
East India ... ...(month)	...	...	...	...	...	...	...	...	...	...	—	—	—
Kalgoorlie ... ...(month)	3,073	...	...	...	...	2,820	...	...	...	...	17	9.805	- 1,508
La Plata ... ...(month)	...	...	...	...	...	...	...	...	...	...	—	—	—
Lima ... ...(month)	32,930	..	...	...	...	34,200	...	...	...	...	17	140,583	+ 5,910
Madras ... ... Rs.	...	(2 weeks)	27,206	...	...	...	(2 weeks)	29,191	...	...	19	262.218	+ 22,292
Melbourne ... ...(month)	65.500	...	...	...	...	65.000	...	...	...	...	17	262.500	+ 500
Mexico ... (month) $	583,558	...	...	...	...	594,988	...	...	...	...	17	2,345.807	+264.842
Montevideo ... ...(month)	...	...	...	...	...	...	...	...	...	...	—	—	—
Para	4,030	...	...	...	...	3.581	...	...	...	...	—	—	—
Port Elizabeth ... ...(month)	4,357	...	...	...	...	3,758	...	...	...	...	17	16.633	+ 245
Puebla ... ... (month) $	60,700	...	...	...	...	68,100	...	...	...	...	17	263.500	+ 31.200
Rangoon ... ...(month)	5.351	...	...	...	...	5.367	...	...	...	...	17	22.014	+ 675
Shanghai ... ... $	18,756	21.170	22.824	22.313	...	24,800	26.200	25.200	23.400	...	20	484.200	+ 77.772
Singapore ... ... $	11.580	12.718	12,458	11,971	...	11,435	12,495	12,844	11,346	...	21	251.710	+ 9.098
Toronto ... ... (month) $	760,676	...	...	...	...	830,299	...	...	...	...	17	3,292.255	+263.847
Winnipeg ... ... (month) $	323,563	...	...	...	...	337,414	...	...	...	...	17	1,418.875	+ 94,366

(Continued on page 478).

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TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1913. WEEKS ENDED. May 3.	May 10.	May 17.	May 24.	1914. WEEKS ENDED. May 2.	May 9.	May 16.	May 23.	AGGREGATE. Wks.	1914.	Increase or Decrease.
	£	£	£	£	£	£	£	£		£	£
Aberdeen Corporation	1,434	1,653	1,576	1,586	1,595	1,752	1,626	1,752	51	81,584	+ 5,012
Accrington Corporation	569	554	681	580	580	571	555	604	7	4,299	+ 184
Ayr Corporation	258	260	255	300	304	274	271	387	1	464	+ 66
Bath Electric	839	793	767	1,217	1,005	900	815	1,369	20	16,603	+ 1,329
Birkenhead Corporation	1,412	1,221	1,307	1,226	1,443	1,247	1,258	1,264	7½	10,004	+ 335
Birmingham Corporation	11,353	11,499	12,895	11,139	12,438	12,359	12,230	12,712	8	96,450	+ 6,554
Blackburn Corporation	1,186	1,215	1,642	1,203	1,319	1,273	1,179	1,430	8	11,156	+ 1,157
Blackpool Corporation	971	670	3,365	2,132	1,125	814	687	860	8	9,443	− 121
Bolton Corporation	2,600	2,677	3,011	2,756	2,818	2,696	2,909	2,751	8	22,597	+ 1,431
Bournemouth Corporation	1,767	2,616	2,115	2,052	1,845	1,782	2,012	1,825	8	16,828	+ 576
Bradford Corporation	5,771	6,149	7,600	5,664	6,368	5,859	6,325	6,099	8	49,170	+ 3,152
Brighton Corporation	912	1,046	1,211	1,025	996	899	1,039	1,077	7½	8,263	+ 728
Bristol	7,210	7,328	10,174	7,489	8,539	8,155	8,043	9,177	20½	160,643	+ 13,454
British Electrical Federation	43,472	43,447	58,466	46,919	56,095	53,836	53,215	59,757	—	—	—
Burnley Corporation	1,600	1,642	1,961	1,572	1,838	1,606	1,654	1,647	8	13,864	+ 630
Burton-on-Trent Corporation	295	290	302	270	286	297	290	302	8	2,322	+ 113
Bury Corporation	1,350	1,354	1,626	1,408	1,364	1,291	1,395	1,321	7½	11,021	+ 317
Cardiff Corporation	2,545	2,576	3,131	..	2,732	2,734	2,744	..	6	18,866	+ 1,067
Chatham and District	883	849	1,124	839	918	870	836	955	20	17,489	+ 275
Chesterfield Corporation	240	244	350	232	386	323	251	270	7	2,156	+ 291
Colne Corporation	260	270	373	273	296	262	290	310	—	—	—
Cork Electric	481	494	517	493	544	484	500	591	20	9,545	+ 247
Croydon Corporation	1,594	1,581	2,127	1,632	1,789	1,695	1,604	1,875	7	13,564	+ 1,175
Darlington Corporation	251	261	287	241	244	246	259	256	8	2,064	+ 114
Derby Corporation	951	962	1,254	984	1,049	946	998	1,022	7½	7,929	+ 361
Dover Corporation	213	217	294	221	233	209	206	242	8	1,819	+ 92
Dublin and Lucan	136	134	161	158	151	135	136	170	20	2,573	− 43
Dublin United	5,862	5,978	6,175	5,896	5,976	5,878	5,703	6,409	20½	111,674	− 2,633
Dundee City	1,223	1,314	1,256	1,297	1,330	1,328	1,272	1,336	1	976	+ 31
East Ham Corporation	1,120	1,093	1,150	949	1,023	1,007	986	1,061	7½	7,986	− 115
Exeter Corporation	314	313	428	331	351	323	323	384	8	2,708	+ 236
Gearless Motor 'Buses	205	255	340	390	510	468	481	547	21	9,645	+ 8,059
Glasgow Corporation	20,082	20,382	20,672	20,611	21,600	21,363	22,357	22,368	51	1,054,207	+ 72,122
Glossop (Urban Elec. Supply Co.)	133	135	155	125	126	128	128	124	21	2,578	− 53
Halifax Corporation	1,904	2,001	3,117	2,007	2,114	2,002	1,885	2,208	7	15,514	+ 663
Hastings and District	940	877	1,247	1,005	994	874	826	997	20	16,495	— 174
Huddersfield Corporation	2,062	2,111	2,820	2,036	2,199	2,200	2,193	2,268	8	17,975	+ 1,379
Hull Corporation	3,048	3,104	3,337	2,956	3,069	3,144	3,054	3,044	8	24,185	+ 329
Ilford U.D. Council	459	447	587	453	489	472	458	497	7	3,851	+ 362
Ilkeston Corporation	128	167	124	139	126	122	136	123	8	1,073	—
Ipswich Corporation	417	417	599	418	414	417	447	571	8	3,549	+ 347
Isle of Thanet	450	481	852	556	463	442	465	537	34	12,887	+ 634
Kilmarnock Corporation	164	169	231	173	165	175	225	176	1	244	− 32
Lanarkshire	1,623	1,609	1,741	1,728	1,943	1,912	1,849	2,129	20	37,946	+ 5,253
Lancashire United	1,429	1,419	1,765	1,677	1,683	1,610	1,567	1,851	20	32,321	+ 3,819
Leeds City	8,130	8,290	10,226	8,005	8,406	8,067	8,239	8,513	8	65,342	+ 3,244
Leicester Corporation	2,823	2,791	3,327	2,768	2,902	3,029	2,882	3,018	21	58,906	+ 3,257
Leith Corporation	650	704	700	736	715	718	723	799	1	932	+ 70
Leyton U. D. Council	1,284	1,294	..	..	1,353	1,339	..	..	5	7,079	+ 821
Liverpool Corporation	12,644	12,679	13,702	12,579	13,021	13,143	13,115	13,773	20½	264,948	+ 13,508
Llandudno and Colwyn Bay	226	236	645	373	239	228	229	236	25	4,740	− 457
London County Council	42,307	42,111	44,871	40,844	44,148	43,642	42,779	44,961	7	316,271	+ 15,536
London General Omnibus	63,117	63,327	73,927	69,216	67,498	63,517	64,916	74,154	21	1,245,828	+ 31,210
London United	5,901	5,855	9,229	6,785	6,541	6,175	5,925	7,570	21	120,794	+ 3,316
Lowestoft Corporation	149	163	262	186	169	168	163	186	33	6,063	+ 653
Maidstone Corporation	184	188	265	182	203	198	183	205	8	1,653	+ 149
Manchester Corporation	17,091	17,350	20,670	17,005	17,935	17,710	17,614	18,343	8	137,954	+ 5,164
Metro. Electric Tramways	9,016	8,984	11,380	9,176	9,627	9,226	8,858	10,232	21	182,485	+ 3,765
National Steam Car	3,497	2,895	3,371	3,162	6,515	4,641	4,520	5,429	30	115,642	+ 50,251
Nelson Corporation	190	194	248	216	217	196	202	220	7½	1,665	+ 45
Newcastle-on-Tyne Corporation	4,697	4,873	4,689	4,508	5,023	5,089	5,034	5,114	8	39,751	+ 4,084
Newport (Mon.) Corporation	702	713	869	695	774	803	787	825	8	6,384	+ 615
New St. Helens and District	737	750	1,176	769	779	790	781	961	47	38,141	+ 3,073
Northampton Corporation	542	580	384	533	569	597	136	616	7½	4,418	+ 122
Nottingham Corporation	3,265	3,285	4,059	3,139	3,327	3,362	3,276	3,463	7½	25,398	+ 704
Oldham Corporation	2,134	2,225	2,294	2,174	2,235	2,212	2,380	2,231	9	20,373	+ 1,554
Portsmouth Corporation	1,909	1,941	2,522	2,104	2,158	2,038	2,049	2,365	8	17,810	—
Preston Corporation	852	873	1,155	781	859	878	817	884	8	7,066	+ 94
Provincial	1,688	1,700	2,535	1,789	1,883	1,818	1,870	1,983	34	59,507	+ 3,343
Reading Corporation	655	647	805	636	699	673	665	757	7½	5,249	+ 437
Rhondda Tramways	1,157	1,210	1,479	1,116	1,197	1,240	1,193	1,227	20	24,564	+ 1,007
Rochdale Corporation	1,528	1,617	1,989	1,563	1,602	1,572	1,584	1,659	8	12,900	+ 591
Rotherham Corporation	932	1,303	941	961	939	961	1,031	975	8	7,892	+ 54
Salford Corporation	5,005	5,278	6,739	5,056	4,992	4,883	5,313	5,034	8	40,653	− 276
Sheffield Corporation	7,359	7,657	8,180	7,292	7,457	7,463	7,641	7,532	8½	65,522	+ 2,429
Southampton Corporation	1,207	1,191	1,464	1,279	1,303	1,273	1,290	1,379	7	9,548	+ 549
Southend-on-Sea Corporation	720	747	1,189	797	903	846	791	912	8	6,788	+ 1,254
South Metro. Tramways	803	795	1,207	856	1,226	1,114	1,091	1,263	21	21,795	+ 6,026
South Shields Corporation	676	706	792	668	722	727	741	754	7½	5,815	+ 789
Sunderland Corporation	1,401	1,411	1,482	1,373	1,366	1,343	1,410	1,463	8	11,085	+ 474
Swindon Corporation	158	145	187	170	169	159	155	183	7	1,266	+ 150
Torquay Tramways	463	482	879	637	577	471	503	588	20	9,738	+ 71
Tramways (M.E.T.) Omnibus Co.	2,935	2,990	4,689	4,134	9,835	9,052	9,299	10,193	21	178,973	+144,503
Tyneside Tramways and Tramroad	467	520	599	477	525	511	507	575	20	10,460	+ 627
Wallasey Corporation	1,170	1,151	1,576	1,169	1,223	1,239	1,209	1,300	7½	9,724	+ 615
Walsall Corporation	625	644	848	577	607	615	606	628	21	12,831	+ 124
Walthamstow U.D. Council	697	700	1,072	753	803	743	750	864	8	6,353	+ 1,534
Warrington Corporation	461	455	..	..	427	438	..	..	5	2,351	+ 10
West Ham Corporation	2,791	2,703	3,203	2,689	2,832	2,780	2,711	2,943	7	21,155	+ 1,052
Wigan Corporation	1,433	1,501	1,807	1,428	1,428	1,488	1,470	1,584	7	11,253	+ 369
Wolverhampton Corporation	1,050	1,541	1,085	1,056	1,019	998	1,059	1,016	9	8,822	− 46
Yorkshire (West. Riding)	1,664	1,483	2,047	1,429	1,361	1,356	1,613	1,395	21	30,053	+ 665

Electric Railways.

NAME OF COMPANY.											
Central London	5,147	5,119	4,388	4,663	4,891	5,005	4,932	4,803	21	105,915	− 3,771
City and South London	2,743	2,747	2,692	2,547	2,557	2,574	2,508	2,477	21	57,475	− 4,313
Liverpool Overhead	1,677	1,714	1,982	1,659	1,719	1,633	1,892	2,001	21	35,366	+ 1,265
London Electric	14,170	13,920	13,650	13,000	13,835	13,995	13,520	13,270	21	301,205	+ 520
Mersey	2,161	2,352	2,308	2,157	2,180	2,314	2,212	2,174	21	47,352	+ 35
Metropolitan	16,508	16,920	17,448	16,503	17,912	17,773	18,151	18,148	21	376,036	+ 31,592
Metropolitan District	12,949	13,038	13,041	12,892	12,865	12,907	12,901	13,039	21	275,915	+ 300

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officals and the principal particulars relating to each undertaking.

The directory is revised as occasion requires, and is the most up-to-date and comprehensive list published.

The Tramway & Railway World can be obtained, post free, at the following rates:
For the United Kingdom—
Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—
Thirty Shillings per annum.

Tel. No.: **2948** Gerrard.
Telegraphic Address: **"Tramigro," London.**

Amberley House, Norfolk St., W.C.

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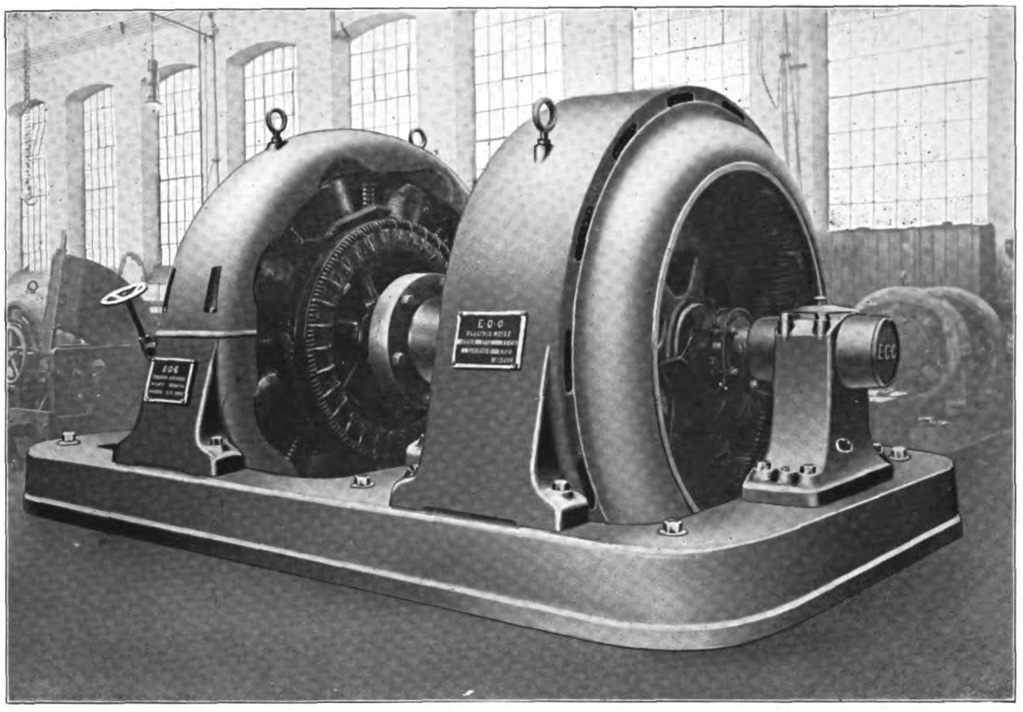
E.C.C.

ELECTRICAL PLANT AND SWITCHGEAR

OF EVERY DESCRIPTION.



600 KW. SYNCHRONOUS MOTOR-GENERATOR.

THE

ELECTRIC CONSTRUCTION CO., LTD.

HEAD OFFICE:

TELEPHONES—10920 Central; 2671 London Wall.
TELEGRAMS—"Concordance," London.

ADDRESS—
DASHWOOD HOUSE,
9, NEW BROAD STREET,

LONDON.

WORKS:

TELEPHONES—75 and 430 Wolverhampton.
TELEGRAMS—"Electric," Wolverhampton.

ADDRESS—
BUSHBURY,

WOLVERHAMPTON.

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BRITISH BERNA

Reliable and Economical Commercial Vehicles.

BRITISH MAKE THROUGHOUT

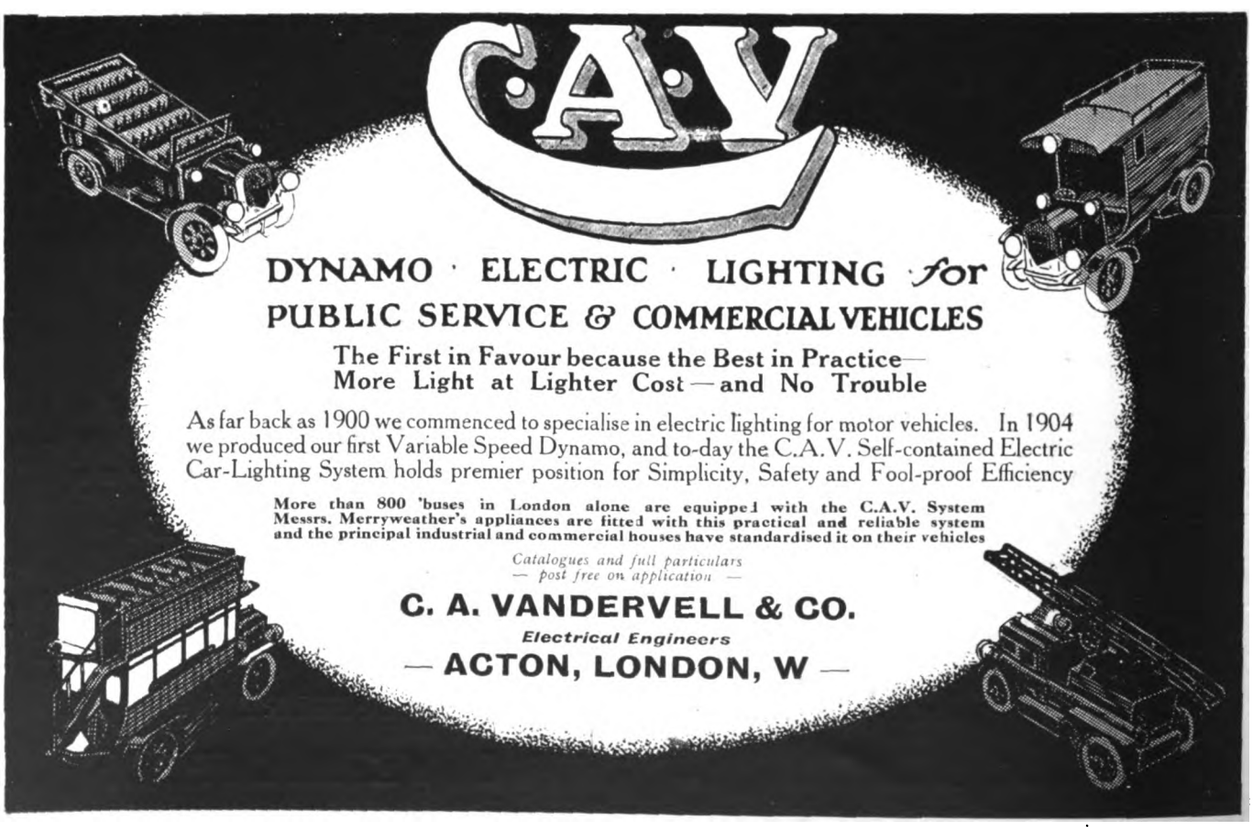
BRITISH MAKE THROUGHOUT

No good points sacrificed. **Many improvements added.**

British Berna Motor Lorries, Ltd.

Avonmore Road, West Kensington, London, W.

Telephone—4542 Western. Telegraphic Address - 'Britberna Phone, London."


C.A.V.
DYNAMO · ELECTRIC · LIGHTING for
PUBLIC SERVICE & COMMERCIAL VEHICLES
The First in Favour because the Best in Practice—
More Light at Lighter Cost—and No Trouble
As far back as 1900 we commenced to specialise in electric lighting for motor vehicles. In 1904 we produced our first Variable Speed Dynamo, and to-day the C.A.V. Self-contained Electric Car-Lighting System holds premier position for Simplicity, Safety and Fool-proof Efficiency
More than 800 'buses in London alone are equipped with the C.A.V. System Messrs. Merryweather's appliances are fitted with this practical and reliable system and the principal industrial and commercial houses have standardised it on their vehicles
Catalogues and full particulars — post free on application —
C. A. VANDERVELL & CO.
Electrical Engineers
— ACTON, LONDON, W —

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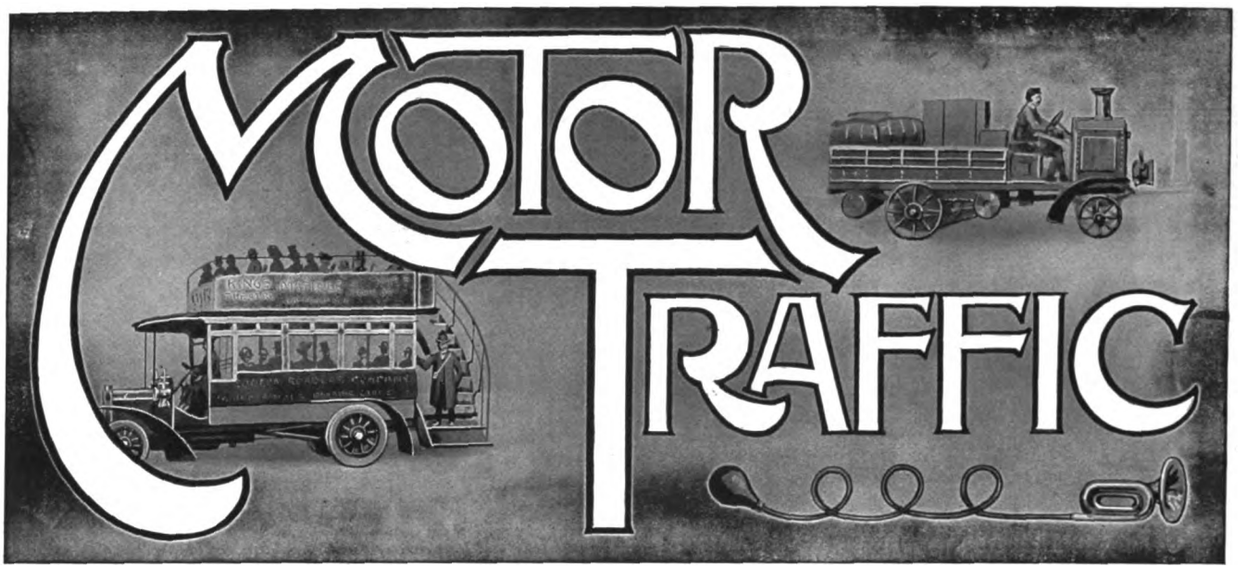

Public authorities and individuals who contemplate running passenger motor vehicles, whether public or private, would be well advised to place their orders as early as possible, for next winter several municipal councils will require a considerable number of omnibuses. Prominent among these will be Manchester, Liverpool, Sheffield, and Birkenhead. The first, third, and fourth mentioned places have this session obtained Parliamentary powers to provide this means of locomotion to a number of districts outside of their boundaries, and in the case of Sheffield the outlay on omnibuses is put down at £19,000. At Liverpool several suburban services have been instituted this year, and still the public demand is not satisfied. A few days ago a local newspaper reported that the Tramway Committee have been inundated with requests for omnibus facilities, and that all the vehicles ordered a few months ago have been delivered and are now on the road. It is to be hoped that the committee will not pay undue regard to the following observation made by the same journal, viz., "As the committee gain experience in services which have been remunerative from the commencement, concessions in fares, which in one case are felt to be excessive, may be expected." If there is one thing more than another that owners of omnibuses should avoid it is the yielding to clamour for unduly low fares. Numerous tramway undertakings admit their mistake in that respect, with the result that it is owing to unremunerative fares that a number of them have had to levy a rate in order to meet their obligations. Without the higher fares which are imposed in the large area where the London omnibuses have the field to themselves, the Metropolitan undertakings would have a very different financial tale to tell. Moreover, the omnibuses are being provided at the expense of the ratepayers of the borough councils with wood-paved roads laid on nine inches of concrete. This must tend to reduce their running costs and maintenance costs, a further fall in which may be looked for when the rural portions of routes extending over 25 miles from Westminster have been relaid with something more durable than water-bound macadam.

A further reason may be advanced for anticipating additions in a short time to the number of municipal omnibus enterprises. It is to be found in the appearance just now of the first annual accounts of the running of modern omnibuses under the auspices of local authorities. The results of half-a-dozen pioneer ventures with the earlier machines need not be referred to on this occasion, except to observe that two of these towns, and Eastbourne in particular, as the result of a long and studious experience have reached a more promising position. The first accounts to reach us were those of the omnibus department of Warrington tramways undertaking, under whose auspices three petrol-electric vehicles started business on July 3 last with an average of two omnibuses in use daily. The accounts and the statistical information combined provide just the enlightenment that municipalities have been waiting for, and as the eight pages have been issued separately from the tramway accounts the document can be inexpensively supplied to other authorities. The statistical information is a model compilation, and much of it will be found reproduced in another column. There is only one additional item that might be suggested for inclusion therein, and that is the nature of the roads upon which the vehicles are operated. The routes are two in number, one being 1·250 and the other 2·375 miles. For the route just exceeding a mile the fare of one penny for adults is not unreasonable, and it would be interesting to learn why twopence has not been charged for the other service, which covers twice the distance. The higher charge would have considerably increased the average traffic revenue per omnibus-mile of 9·259d.

A noteworthy feature of the Warrington accounts is that the average working expenses per omnibus-mile (including 2·679d. as the cost of petrol) works out at almost the same amount as the makers of the Warrington omnibuses have shown in our columns for their own machines running over a variety of surfaces in London and its environs. It is 7·636d. The income per omnibus-mile was 9·281d. There is an absence of statistical information in the omnibus section of the Birmingham tramways report, which relates to a period 16 days longer than at Warrington, the service being on an outlying route. While the average expenditure per omnibus-mile was 9·288d., the receipts were correspondingly high, or viz., 12·357d. The items on which the Warrington figures were exceeded comprised traffic expenses and repairs and maintenance, while ·360d. was added for superintendence. The greatest difference in any one item was in tire maintenance, Birmingham expending 1·001d. and Warrington ·819d. Before another year has passed Birmingham will have become

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MOTOR TRAFFIC.

the greatest omnibus-owning municipality, the Corporation having arranged to take over the Omnibus Company's business. Last year's net profit of £500 should be a good augury for future operations. The latest extensive tramway undertaking credited with the intention of adopting road motor vehicles is the South Lancashire Tramways Company, who, in self-defence, are turning to chars-a-bancs. That the chassis of these vehicles can be fitted with another body is a consideration of some value in view of the fact that the directors are considering with Liverpool Corporation the possibility of engaging in goods transport.

INDUSTRIAL MOTOR PARADE.

The eighth annual parade of industrial motor vehicles took place on Whit-Monday in Grosvenor Road and the adjacent streets, and from all points of view it was a great success. The parade is organised by the Commercial Motor Users' Association with the object of encouraging, by means of money prizes and other awards, the drivers of commercial motors to take a keener interest in the driving and condition of their vehicles, and to run them economically and without accident. The number of entries this year – 508—largely exceeded the most sanguine expectations, and, indeed, has so increased the difficulty of finding accommodation for the vehicles in the streets that a drastic alteration is to be instituted in the organisation of future parades.

View of a Portion of the Industrial Motor Vehicle Parade Opposite the Tate Gallery, London.

A special parade committee undertakes the organisation of these parades, which are supported by the Royal Automobile Club and the Society of Motor Manufacturers and Traders. In addition to the general prize list, a number of manufacturers contributed donations to a special prize fund, to be divided, at the discretion of the judges, between the drivers of vehicles of their respective makes, and allied traders and tire manufacturers made donations upon a like understanding. The team section, in which the "Commercial Motor" Cup is awarded, was again well supported, 33 teams competing. The award is made on the result of the inspecting engineer's report, and the judge's inspection of the "team" on parade. A silver cup and a silver goblet were again offered for competition amongst engineers for the group of vehicles showing the best condition. A new prize for owners was offered for the best advertisement effect in bodywork. Two written technical examinations, for petrol and steam drivers respectively, were held to determine the "champion" drivers, at which 37 petrol drivers and 15 steam drivers presented themselves. A first prize of £10 and a second prize of £5 are being awarded under each examination. Mr. G. W. Watson again acted as inspecting engineer to examine the vehicles, drivers, and store sheds before the parade. The inspections commenced early in January, 1914. Unfortunately the inspecting engineer was taken seriously ill just prior to the drivers' championship examinations, and in his absence this work was undertaken by Mr. T. B. Browne, the chairman of the Parade Committee.

This year the policy was continued of holding entirely separate examinations for petrol and steam vehicle drivers respectively on different dates, viz., Saturdays, May 9 and 16, at the Royal Automobile Club, thus enabling a driver experienced in working both classes of vehicle to enter for both examinations. The numbers presenting themselves showed a slight decrease on last year's figures as regards petrol drivers, but of steam drivers the number was the same as last year. It had been decided to award certificates to 13 of the 37 petrol drivers, and to six of the 15 steam drivers. In his report to the committee, Mr. Browne stated that all those gaining certificates had sent in papers of a very high standard of excellence, and it had been interesting to notice the great increase in practical and theoretical knowledge gained by many who had regularly attended the lectures given by the inspecting engineer. This affords a remarkable testimony to the value of the lectures.

It will be seen from the foregoing that every effort is made to render the parade of practical value to the motor industry, and in view of the fact that the cost of maintenance depends largely upon the manner in which the vehicle is handled by the driver, the committee are to be congratulated upon the results obtained in this direction.

Amongst the guests of the Commercial Motor Users' Association who were afterwards entertained to lunch at the Royal Automobile Club were Brigadier-General S. S. Long, Major-General F. B. Landon, C.B., Mr. W. Joynson Hicks, M.P., Mr. Rees Jeffreys, secretary to the Road Board; Mr. E. W. Curtis, vice-president of the Motor Truck Club of America; Mr. W. Duddell, president of the Institute of Electrical Engineers; Lieut.-Col. Fox, chief of the London Salvage Corps; Superintendent Bassom, Public Vehicle Department of the Metropolitan Police; and Mr. H. E. Blain, operating manager of the London General Omnibus Company. In proposing the toast "The Parade Committee and Officers," Mr. Blain congratulated the judges and the executive officers upon the manner in which they had performed their onerous duties, and referred especially to Mr. A. W. Windsor, the chief marshal, and his assistants, to whom the greatest possible credit was due for assembling and dispersing the unprecedented number of vehicles without the semblance of a hitch or the dislocation of the ordinary traffic.

The following is a list of the parade committee and officers:

Judges: Messrs. T. B. Browne (chairman), past president of the Institution of Automobile Engineers; E. Percy Beavan; Colonel R.

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E. Crompton, C.B., chairman of the Commercial Motor Users' Association; Major Donohue, Army Service Corps; Mr. T. E. Harrison; Colonel T. J. Kearns, C.B., Army Service Corps, 1st Division, County of London (T.F.); Messrs. D. S. Kennedy; W. G. Lobjoit, vice-chairman of the Commercial Motor Users' Association; E. E. Rudge; E. S. Shrapnell-Smith; H. Lyon Thomson; George W. Watson; and Chas. Wheeler. Mr. Arthur W. Windsor was the chief marshal, and Captain E. H. Blamey, A.S.C., and Mr. Cecil S. Windsor were the assistant chief marshals. The other marshals were Messrs C. H. Adams, M. V. Ambler, G. R. Barnes, F. A. Bonsor, P. Cannon, H. S. Carr, J. Cates, W. H. Cavender, H. J. Chapman, F. W. K. Davies, W. T. Edmonds, M. Elliot, L. Fenner, S. S. Kennedy, G. M. Junner, H. C. Lovell, A. Meyrick, R. J. Mitchell, A. Norris, A. W. Pine, C. C. Ransley, C. A. Ross, H. A. Sturch, W. A. Vacher, R. W. Wilkins; and Mr. Frederick G. Bristow was again assiduous as secretary.

The principal prize winners were as appended:

Drivers' championship, petrol.—£10 souvenir badge and certificate of merit: C. Ransley, Midland Railway, driver of a Milnes-Daimler van with 84,000 miles to its credit; £5 badge and certificate; W. Denyer, Gas Light and Coke Company, Panhard van. In the steam section C. Brister was first and R. L. McKinlay was second, the prizes being the same as in the petrol section.

Team prize.—Won by six Albion vans owned by Messrs. Spiers and Ponds. Special prize of £3 3s.—The Gas Light and Coke Company for a team of six "Commer Cars" as runners up.

Engineers' prizes.—Given for the group of vehicles showing the best condition: F. Whalley, of Fry Brothers, Limited, and H. Chapman, Gas Light and Coke Company.

Long service prizes.—£2 2s. and £1 1s. to drivers who had driven motor vehicles for one employer for the longest period without a break: G. Johnson, of Allen and Hanburys, 12 years 2½ months; and P. Driscoll, Westminster City Council, 12 years 1½ months.

Continental cup.—Presented by the Continental Tire Company to the owner of the highest marked vehicle fitted with Continental tires: Selfridge and Company, Limited, with a "Halley" van which had completed 65,000 miles.

Amongst the winners of the six silver cups awarded to the owners of vehicles delivered from the works since April 1 this year was Mr. Clarkson, for his new coke-burning steam lorry. This machine attracted considerable attention when on parade. The general prize list for drivers included 20 first class prizes of £2 2s., 25 second class of £1 10s.; and 120 third class of £1 each. There were also prizes for parcel cars.

The special firm prize list was well supported, all the leading firms in the industry being represented. These included the Albion Motor Car Company, Avon Tire Company, Commercial Cars, Limited, Daimler Motors, Limited, Dennis Bros., Limited, Dunlop Tire and Rubber Company, Halley Industrial Motors, Limited, Leyland Motors, Limited, Peter Union Tire Company, Shrewsbury and Challiner Tire Company, Vandervell and Company, etc.

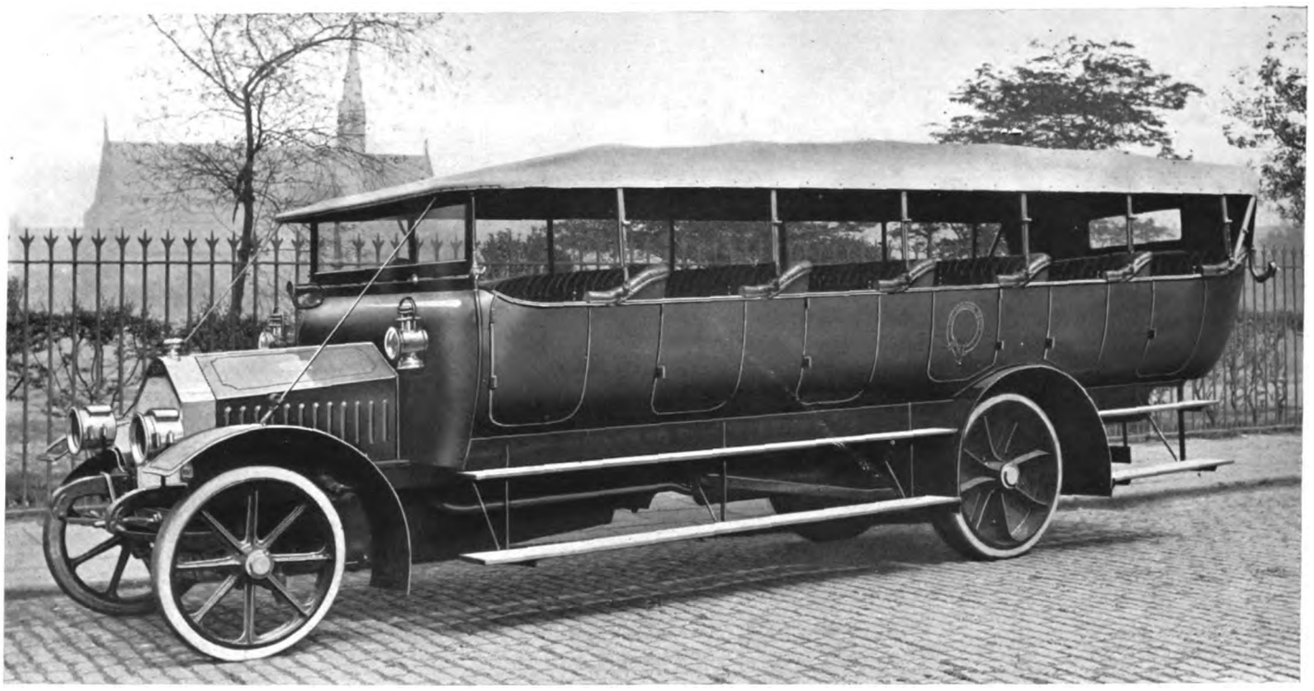
Nearly one-fifth of the total number of vehicles were, we are informed, equipped with Polack tires.

ORIGINAL BERNA CHAR-A-BANCS.

The char-a-bancs illustrated on this page is mounted upon the C type 28-30-H.P. original Berna chassis, designed for a load of 3½ tons. The four-cylinder engine, with bore and stroke 105 mm. and 160 mm. respectively, has both the inlet and exhaust valves operated by one cam shaft. The crank shaft is carried in three ball bearings of large size, the whole engine being supported by the frame at three points only. A feature worthy of note is that the bottom half of the base chamber can be removed without in any way disturbing the bearings. Bosch high-tension magneto of the latest improved type is fitted.

An efficient water cooling system is maintained by means of a powerful centrifugal pump which is gear driven, the honeycomb type of radiator having an exceptionally large cooling area. Perfect lubrication is assured under all conditions, the oil being raised from a sump in the base chamber by a pump driven off the cam shaft by a spur wheel, and automatically fed to all wearing parts. The leather-faced cone clutch can readily be removed or regulated without disturbing any other part of the machine.

The gear box gives four speeds forward and one reverse, all the shafts being carried upon ball bearings. The gear wheels are cut from the solid and specially hardened. The change speed gear is of the "gate" type with two sliding rods and safety catches. The transmission is by a cardan shaft to the differential, thence by shafts fitted with pinions intermeshing with internally cut rings attached to the road wheels, the whole gearing being encased and provided with ball bearings, which are automatically lubricated. The differential is of the crown and bevel wheel type, mounted in such a manner as to relieve it from any strain of the load carried upon the gears or casing. All the shafts and gears run on ball bearings.



C Type 28-30-h.p. Original Berna Char-a-Bancs.

For the road wheels toughened cast steel is used, and they are fitted with ball bearings and thrust ball washers to take up all lateral strains. Special attention has been paid to the braking of the machine. Three brakes are fitted, the foot brake, acting upon a drum in front of the differential, consists of two adjustable cast-iron shoes pivoted upon rocking arms, easy adjustment being made by a spring lock nut. The hand brake has internally expanding shoes acting upon both wheels.

As will be seen from the illustration, the body is of handsome appearance. Its designers and builders were C. T. Faulkner and Company, Limited, of Manchester, and it has seating accommodation for 30 passengers. It is painted Peverill green with black lines, upholstered in real leather to match, and is fitted with glass wind screen and collapsible hood, all the metal fittings being of brass.

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MOTOR TRAFFIC.

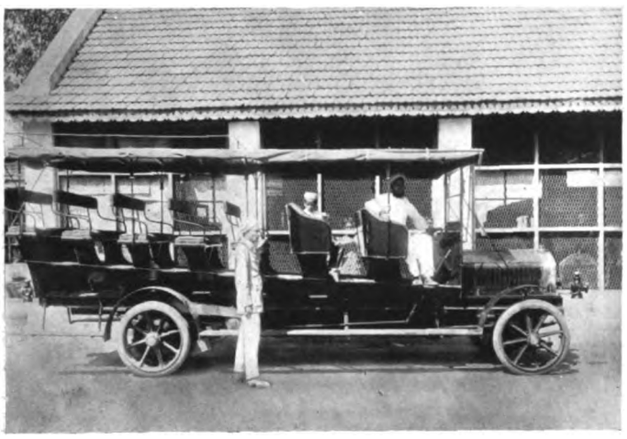
FOUR ALBION TYPES.

The world-wide demand for the products of the Albion Motor Car Company, Limited, Glasgow, is shown by the several illustrations produced on this page. The first represents a 32-H.P. open-side char-a-bancs, seating 34 persons, supplied to the Ibraham Motor Service Company, of Madura, in the Madras Presidency. The Albion Company report an increasing demand for this type of char-a-bancs for overseas users, many firms abroad owning large fleets. The Federated Malay State Cycle and Carriage Company, for instance, run 40 Albion vehicles of this type.

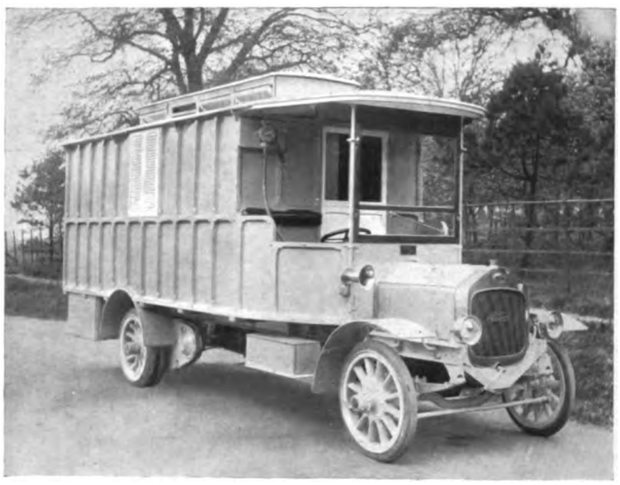
The 2-ton Albion vehicle, shown loaded with a number of crates containing hats and caps, is owned by Sutton and Company, carriers, Manchester. Although the load looks considerable, it does not weigh more than 35 cwts., and the top part of it just passes under the overhead tramway wires. This vehicle runs from the company's Denton branch into Manchester, and it is interesting to learn that the Denton manager of this firm is grumbling at the bridges that are met on the road and the tramway wires, as he would like to make the load higher. The vehicle would be capable of carrying a heavier load.

Few firms of carriers to whom speed is a consideration are content nowadays with using horse vehicles. Many of them in making the change over to motor traction have availed themselves of the experience of the Albion Motor Car Company, whose products in this department range from fast delivery vans to lorries and platforms that will carry box vans containing several tons. An example of the latter for a 4-ton load, fitted with an engine developing 32-H.P., was supplied to Currie and Company, Newcastle-on-Tyne, by the Albion Company's agents in the district, Little and Company, College Avenue, Newcastle.

Several other carriers have recently placed repeat orders with the Albion Company. W. F. and J. Worley, carriers, London, ordered one 32-H.P. 3-ton Albion; this firm have now three Albions in constant use. Sutton and Company, carriers, Manchester, have placed a further order for two 32-H.P. 3-ton Albions, which now increases their fleet to 16; T. Wallace and Company, carriers, London, who have already four Albion vehicles, have placed a further repeat order for one 16-H.P. 25-cwt. vehicle; a further repeat order for one 15-H.P. 20-cwt. van is from the India Rubber, Guttapercha, and Telegraph Works, Limited, London, who are manufacturers of the well-known Palmer tires. Firms so closely related to the motor industry are alive to the best makes of vehicle in the market, and this further repeat order affords testimony of the high reputation of Albion vehicles.

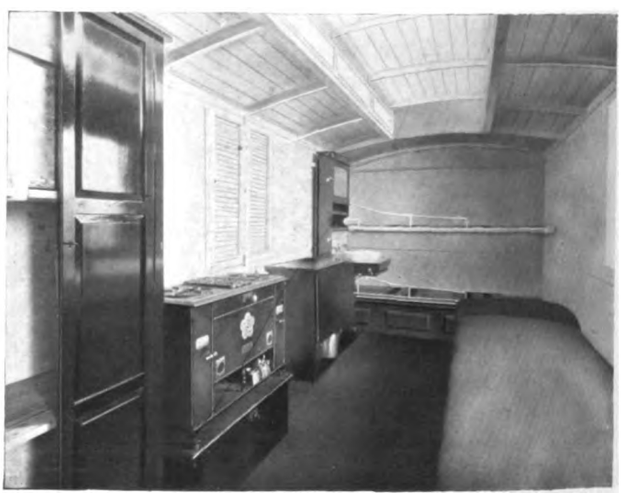


32-h.p. Char-a-Bancs at Madura, India.



25-h.p. Albion Caravan for Use in Spain.

2-ton Albion Lorry in Manchester Service.



Interior of the Caravan.

The 25-H.P. Albion caravan has a chassis generally of Albion standard design. The body is tastefully finished in French grey with darker mouldings. The entrance door is at the front, part of the driver's seat being arranged to fold up. Internal dimensions of the body are 13 ft. 6 in. long by 7 ft. 6 in. wide by 7 ft. 6 in. high to the underside of the domed roof, which is fitted with four glazed ventillation louvres. On either side of the body are French windows fitted externally, for coolness and privacy, with Venetian fold-back shutters. At the rear are fixed two spring mattress marine berths, one above the other, and on the near side is placed a comfortable couch, which may also be used as bed. On the same side near the door is fixed a wardrobe; on the other side a fold-up washing and toilet set, and table with outside folding leaf, a large oil stove, and a further cupboard with a water tank on the top. For filling the water tank, a hand pump is fitted, as shown on the photograph above the driver's seat, with length of flexible tubing. The vehicle is for use in Spain.

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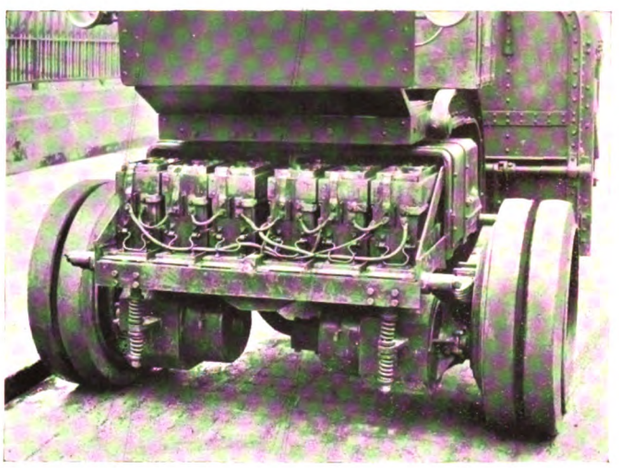
MOTOR TRAFFIC.

FRAM ELECTRIC VEHICLES.

THE DRIVING MECHANISM IN THE FORE CARRIAGE.

The Fram electric wagon is a result of every-day practical use on the Continent for the past three and more years, and all the details which experience has pointed out have been embodied in its construction. It has the advantage of being very economical in its working expenses, and when the wagon is at a standstill there is no moving machinery whatever. It is quiet when working; emits no smoke, steam, or other vapours. It is very flexible and can be readily driven by any man accustomed to horses after a very short tuition.



Battery and Motors of a 5-Ton Wagon.

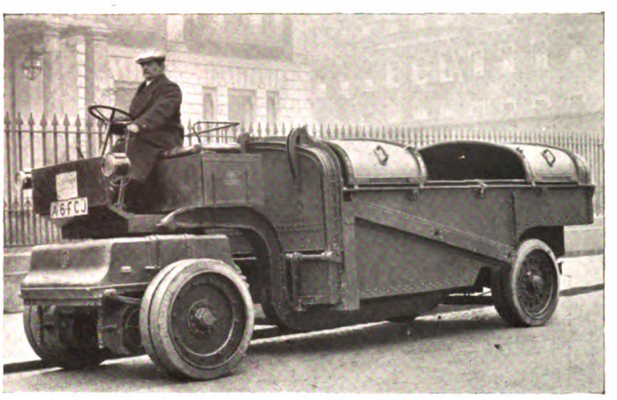
The drive being through the front wheels there is an entire absence of all driving mechanism from the rear part of the wagon. There is no clutch, change-speed gearing, cardan shaft, live axle, differential gearing, or chain drive. Thus the whole driving mechanism is of the simplest mechanical form, and the cost of maintenance is reduced to a minimum. The only parts needing attention are the bearings of the motors and the gear wheels. A further important feature of the front drive is that slipping and skidding are eliminated. The absence of these drawbacks, combined with the even driving power of the electric motors, increases the life of the tires. In starting, and when turning, as at all times, every ounce of tractive effort is used to the best advantage. The front drive enables the vehicle to be manœuvred in very confined spaces. The whole fore carriage being pivoted about its centre enables a very large lock to be obtained, and the vehicle even with a long wheel base can turn in a narrow street.

10-20-Cwt. Chassis Fitted with Van Body.

Another feature of the Fram wagon is that when fully loaded the total weight is very evenly distributed between the front and the back axle, with the result that the vehicle is able to get out of soft ground that would hold a rear-driven wagon. For work calling for a wagon to creep along the kerb, the front drive has a great advantage in that the wagon is able to draw out and pass any other vehicle even on a slippery steeply-cambered surface.

CAPACITY OF THE BATTERY.

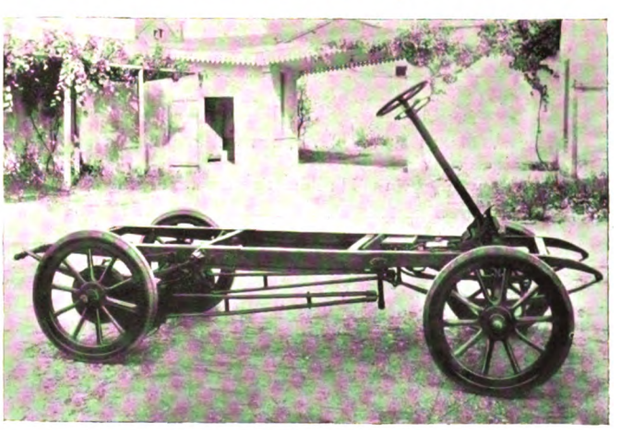
The fore carriage contains all the driving mechanism, including the battery, except for a portion of the battery which is placed under the driver's seat, and in itself is therefore a self-contained driving unit, which can be readily attached to other vehicles. The battery supplied is of the Tudor Accumulator Company's make, the lead battery being of high electrical and mechanical efficiency. The cells are carried in trays, which are readily placed in and taken out of position for inspection purposes. The capacity of the battery fitted to the different size vehicles at the 5-hour rate of discharge (the number of cells being 44) is (*a*) 5-ton wagon 320 ampere-hours, or (*b*) 435 ampere-hours, (*c*) 3-ton wagon 290 ampere-hours, (*d*) 1½-ton wagon 200 ampere-hours.



Dust Body on a 5-Ton Chassis.

The distance run on one charge is as follows: (*a*) 25-30 miles, (*b*) 50 miles, (*c*) 25-30 miles, (*d*) 37-42. The battery can be charged while in position on the wagon.

Two totally enclosed compound-wound tramway type electric motors are hung on the front axle, and suspended from the frame by coil and recoil springs. These motors are capable of exerting double their power on starting, and for half an hour continuously. The size of the motors is: (*a*) 5-ton wagon, two 7 H.P.; (*b*) 3-ton wagon, two 7 H.P.; (*c*) 1½-ton wagon, two 3 H.P. Each motor drives each front road wheel separately, through double-reduction spur gearing of special steel, the whole being totally enclosed, running on ball bearings.



Rear-Driven 10-20-Cwt. Chassis.

SPECIFICATION OF CHASSIS—STEERING WITHOUT EFFORT.

The chassis is built of channel steel members, strongly braced and fixed to the fore carriage by means of two trunnions of large diameter,

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MOTOR TRAFFIC.

and the stay bolt. These chassis can be supplied "straight," or of a "swan-neck" or "down-swept" pattern. The "straight" pattern is provided for carrying flat platform and lorry bodies, and the "swan-neck" pattern to enable a body to be carried low down and of large capacity, or for any special purpose. The frame of the fore carriage is built of angle irons, strongly braced together, and the whole fore carriage pivots about its centre. Long laminated steel springs are fitted to the front and rear axles. These are especially designed to give easy riding to the whole vehicle, both when running empty and when heavily loaded. The road wheels are of artillery pattern, constructed of wood, the front wheels run on ball bearings, and have sheet steel casings to protect the gears from dust. The rear wheels are fitted with phosphor bronze bearings.

There are two separate powerful mechanical brakes and a separate electrical brake. Each road wheel carries, bolted to it, a large diameter cast-iron drum, on which is fitted a band brake acting through renewable wood blocks. These blocks on the front wheels are worked by a foot pedal, and those on the back wheels by a separate side lever, means of ready adjustment being provided in both cases. The electrical brake is worked by the driving lever, and will stop the wagon in a few feet at any speed.

A Mechanically-Tipped Body.

Fram Electric Lorry.

On the front wheels twin solid rubber tires are usually fitted, and on the rear wheels either rubber or steel tires can be fitted. The sizes of the front wheel tires are as follow: 5-ton wagon, 900 by 120 mm. twin; 3-ton wagon, 900 by 100 mm. twin; 1½-ton wagon, 875 by 75 mm. twin. Both axles are stationary and made of the best steel, and are of large section.

Motor Power Utilised for Tipping.

The steering control is by means of an ordinary steering wheel, acting through a worm of large diameter working in a bronze crown wheel of massive proportions. There are no small pins or rods. When turning sharply the outer wheel automatically revolves at a faster rate, giving the necessary differential motion, and steering round a sharp turn is thus done electrically and without effort on the part of the driver. Driving control is by means of a lever moving in a vertical plane conveniently placed to the driver's left hand. This lever operates an electric controller, which provides five speeds forward, one reverse, and an electrical brake. The control is very simple, and in traffic the wagon is most easily handled.

Any kind of body, a flat platform or a standard lorry body, or a metal tank body, or any other kind, can be supplied and fitted. Water carts and sweepers or other municipal appliances can also be supplied and fitted attached to the fore carriage. Fitted to the chassis there is provided gear operated by hand for tipping the wagon body. A hood or canopy can be provided for the protection of the driver. A combined ammeter and voltmeter is provided and fixed on the footboard close to the driver. Two electric head lamps and a tail lamp are supplied and fitted.

The following are some particulars relating to the 10 to 20-cwt.

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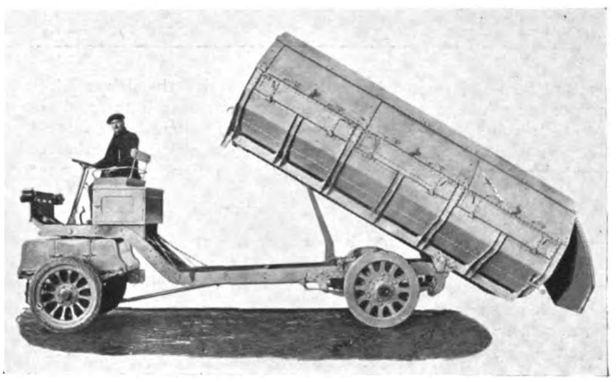
chassis. There are two series motors totally enclosed, 2½ H.P. each. These drive the back road wheels by single-reduction spur gearing. The battery can be of different capacity, 150 to 250 ampere-hours, and consists of 44 cells, the distance of travel on one charge of a 200 ampere-hours battery being approximately 50 miles.

There are five speeds forward and the reverse. The wheels can be fitted with pneumatic or solid rubber tires, and a body having a length of approximately 5 ft. 9 in., and width of 5 ft., both inside measurements, can be fitted.

The controller is fixed to the front of the chassis and the handle is placed under the steering wheel.

A special feature of the Fram electrical wagon is that when proceeding down even a slight decline the motors automatically become generators driven by the momentum of the car, and currents up to 80 and 100 amperes are immediately sent back into the battery. This charge will be of material amount on a long hill. At the same time this action has a most marked braking effect, so that it is not necessary to use the mechanical brakes at the same time. The regeneration takes place automatically on the second and fourth speeds forward.

As already mentioned, the batteries fitted to Fram vehicles are the Tudor Company's make, the lead battery being of high electrical and mechanical efficiency. It can be charged and discharged at much higher rates than the normal without deterioration, and in fact in



A Light Tipping Wagon.

America, boosting charges given during meal times are found to give a longer life and prove more beneficial to the battery than a regular charge and discharge at normal rates. A lead battery can be boosted up during the course of one hour at a rate to start with of two to three times the 5-hour rate, and naturally by keeping the voltage constant the current will decrease. In this way during the duration of one hour some 50 per cent. of the total charge can be given to the battery, and correspondingly some 50 per cent. of the total mileage of the normal charge can be obtained as a result of one hour's boost. Further, lead batteries when discharged at high rates keep up their voltage, so that the acceleration and hill climbing powers of the vehicle are good.

With the heavy 5-ton machine in use on the Continent, the life of the positive plates has been 6,000 to 7,000 miles and that of the negative double. Naturally with lighter machines these mileages will be increased. As to the maintenance of the battery, the Tudor Company are prepared to enter into a maintenance contract for batteries in this country, and to send men to inspect regularly, and to carry out any upkeep necessary, and to do the replating when required. As an alternative they are ready to supply new plates at a fixed charge per mile run, or naturally they will sell the plates outright, and if their own men are required to fit these, they will charge a nominal fee only for the labour.

Mr. Conway Jenkins, 175, Piccadilly, London, is the sole concessionaire for the United Kingdom and the Colonies.

Omnibuses Barred at Buenos Ayres.—In the course of his remarks at the annual meeting of the Anglo-Argentine Tramway Company, the chairman (Mr. J. B. Concanon) announced that upon the question of possible motor omnibus competition, to which he referred at their last annual meeting, the shareholders would be interested to hear that the Municipal Council had recently declined to grant any concessions therefor, upon the grounds that the tramways system was sufficient for the public needs, and that the narrow streets and the paving system would make their operation inapplicable.

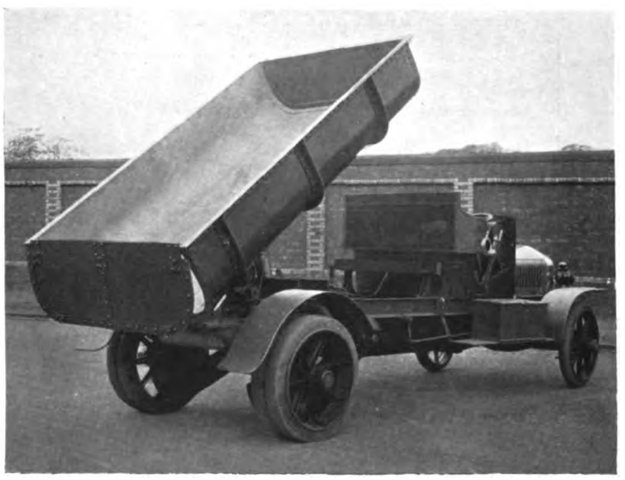
32-H.P. 4-TON ALBION HYDRAULIC TIPPING WAGON.

Illustrations are given on this page of the latest example of a tipping wagon which has been entirely designed at the works of the Albion Motor Car Company, Limited, Glasgow. The hydraulic tipper does away with the drawbacks encountered in using hand and mechanically-operated tipping devices. It merits particular attention owing to its extreme simplicity and the very short time required to tip the body.

Albion 32-h.p. 4-ton Hydraulic Tipping Wagon.

The medium used is light machinery oil, which is forced by means of a pump situated under the driver's seat to a hydraulic tipping ram, which is clearly indicated on the photograph, showing the full angle of tip directly to the rear of the gear box. The cylinder of this ram is carried on trunnion brackets fixed to strong steel cross channels. The trunnions allow the ram and cylinder to accommodate itself to the inclination of the body while tipping. The oil is introduced to the cylinder through the centre of the nearside trunnion.

The hydraulic pump is driven by means of a worm and worm wheel from the propeller shaft of the vehicle. This gear is entirely enclosed,



The Automatic Tailboard.

and runs in an oil bath. The pump is brought into operation by means of a hand lever conveniently placed at the left-hand side of the driver's seat, which connects the worm shaft of the pump with the propeller shaft of the vehicle, through the medium of dog clutches.

A regulator valve is fitted to the system, and this is also situated at the driver's left-hand side. It is so arranged that, when the valve is open, the pump forces the oil back to the reservoir. To bring the tipping ram into operation the regulating valve is closed down, and the oil is thus forced direct to the cylinder. Hence, by means of this

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regulator valve, the body is not necessarily being tipped although the pump may be running. A safety valve is fitted to the pipe between the pump and the tipping cylinder, so that no harm is done to the installation when the ram is forced up to the top of the cylinder, the pressure escaping by means of a safety valve.

To lower the body, the regulator valve is opened, when the weight of the body acting on the ram, forces the oil back from the tipping cylinder to the reservoir. The load can be completely tipped in about one and a quarter minutes, the body returning to its horizontal position in about three-quarters of a minute.

The body is designed to carry 80 cwts. and is built up of steel plates, rigidly braced and strengthened. A noteworthy feature is the fixing of tailboard. It is hinged at the top with special clips, which are automatically freed after the body has been slightly raised, and when the body is lowered are automatically closed.

MORE OMNIBUSES FOR LIVERPOOL AND COVENTRY.

It is reported that at an early date Liverpool Tramways Committee will recommend the Council to purchase probably 20 motor omnibuses. The tramways department are already running a dozen vehicles. Councillor Pridmore, chairman of Coventry Tramways Committee, has informed the Council that the motor omnibuses, which began running two days before the end of the financial year, had so far proved quite satisfactory, and the committee would have to consider the question of purchasing three more. They could utilise more omnibuses to great advantage. On the service to Earlsdon the takings were very good indeed, but probably to some extent at the expense of the tramcars. Therefore they would have to consider the curtailing of the tramcar service in the morning.

AUSTIN MOTOR OMNIBUS.

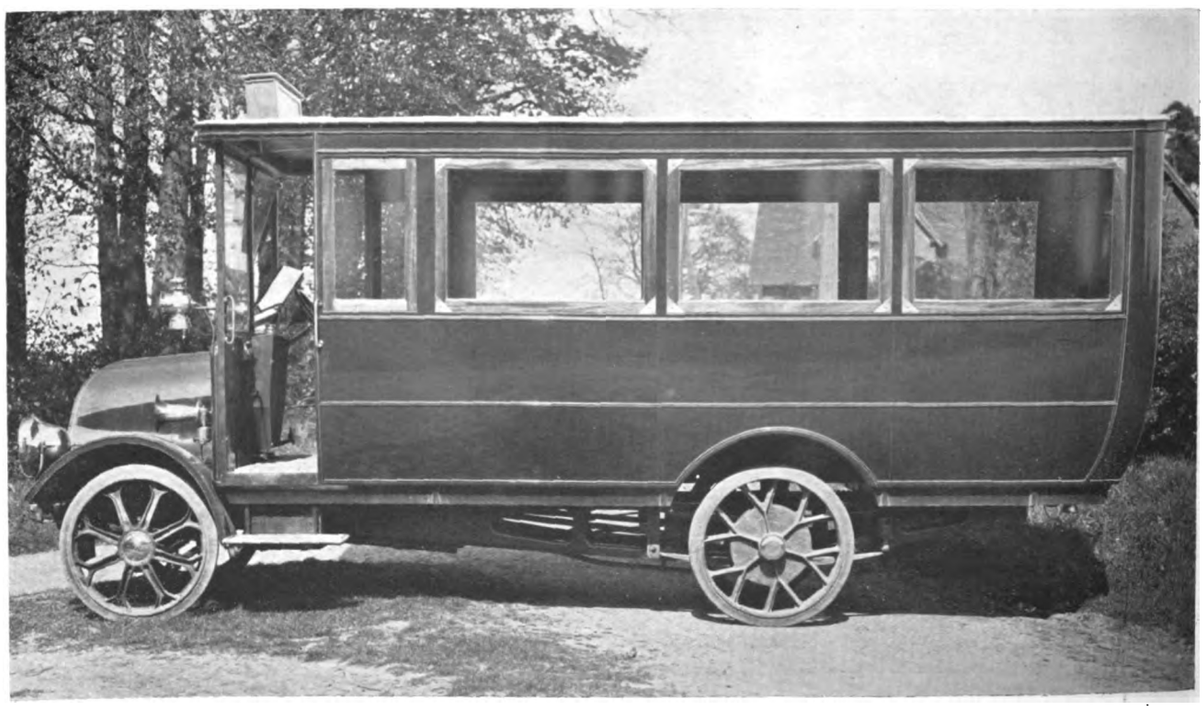
The Austin omnibus illustrated on this page is mounted on a 2-ton lorry chassis; the body seats 20 people inside and two at the side of the driver at the front. The approximate length is 15 ft. 3 in. The inside spring seats are upholstered in rattan. A gangway runs down the centre. The outside is painted in Ripolin green, picked out with gold. The omnibus has been despatched to South Africa for use by the Cape Electric Tramways, Limited. Two omnibuses of a similar type are in hand, and will shortly be despatched to Lisbon.

DENNIS OMNIBUS FOR CHESTERFIELD.

Dennis Brothers, Limited, of Guildford, have just supplied the Chesterfield Corporation Tramways with a 28-seat single-deck omnibus, illustrated below. The chassis is of the Dennis standard type, and the body is a good example of high-class coach work. An interesting

feature is the sloping canopy, designed to give the driver additional protection. The protecting bars in front of the radiator, and the use of electric light for illuminating the destination boards are other features of interest. Dennis Brothers are constructing another vehicle of the same type for the Chesterfield Corporation.

CONTINENTAL TIRES.—A handsome silver cup has been presented to the Society of Automobile Mechanic Drivers, to be awarded to the winner of a billiard handicap held annually by members of the society. The cup is the gift of the Continental Tire and Rubber Company, Limited. In reference to the new concave solid tires of the Continental Company, which were illustrated in our issue dated May 7, it should be mentioned that the carrying capacity of these tires is 48 cwt. and not 25 cwt. The tires are intended for fast-travelling commercial and passenger vehicles.



Austin Type of Omnibus for the Cape and Lisbon Tramways.

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OMNIBUSES AND ROAD MAINTENANCE.

Decisions For and Against by House of Commons Committees.

A Committee of the House of Commons, presided over by Colonel Bathurst, began on May 5 consideration of the Middlesex County Council's bill for the construction of the Great West Road out of London. Mr. Wakelam, the county engineer, spoke in support of a clause which seeks to prohibit the use of the road by motor omnibuses unless the companies pay towards the cost of maintenance. Middlesex, he said, had had more experience of damage by motor omnibuses than any other county. They had had to re-surface Bath Road at a cost of £33,000, and were re-constructing Golders Green Road at a cost of £55 000 owing to motor omnibus damage. Work was also in progress on St. Albans Road, because of the same traffic, at a cost of £14,000. The Council had a scheme before the Road Board for re-surfacing at a cost of £372,000. Previous to the coming of the motor omnibus the average expenditure was 6·16d. per yard per annum, and it had increased to 12·85d. The damage caused to Middlesex roads by motor traffic had already run into hundreds of thousands of pounds.—In cross-examination by Mr. Balfour Browne, K.C., who represented the London General Omnibus Company, Mr. Wakelam admitted that motor cabs and vegetable carts would pass over the road, but said there was not a continuous user in the case of these, and they did not damage the road as motor 'buses did. The right of omnibuses to go free on every road out of London ought not to be allowed. Asked if the omnibuses were not doing a great service to the public, he replied, "So are the tramways, but they have to pay for the maintenance of the roads." Mr. Browne: Are not tramways a little out of date?—Mr. Wakelam: I think not.—The Committee granted the clause, which, as adjusted, provides that omnibus owners who may use the road shall pay a small sum equal to three-eighths of a penny per car-mile by any motor, or other omnibus, over the new roadway, towards the cost of the maintenance of such roadway; all sums to be paid quarterly, and to be deemed to be debt due to the Council, and recoverable from the company. It is further provided that they shall keep a daily record, showing in proper detail the number of journeys and the mileage run by each omnibus on the new roadway, and shall furnish statements of such journeys and mileage quarterly, and shall allow any person duly authorised by the Council at all reasonable times to inspect and take copies of all such records and of any accounts kept by the company. The bill was reported for third reading.

After a hearing of the Walsall Corporation Bill extending over several days, a House of Commons Committee on May 7 granted the clauses in the bill giving authority to install railless trolley car services in several colliery districts, to make a connection with a similar service which is to be installed by the West Bromwich Council, and to run motor omnibuses along the trolley routes and any other route outside the borough. Messrs. J. B. Hamilton and C. J. Spencer, the general managers of Leeds and Bradford tramways, gave evidence against compelling trolley vehicles to contribute towards road maintenance when motor omnibuses, which were already using the roads, paid nothing. The Committee directed that the Corporation should pay £4,000 to the County Council apart from street widening, if required by the trolley system, and also ¾d. per car-mile. Motor omnibuses would be exempted from either charge.

Birkenhead Corporation Omnibuses to Contribute.

On May 14, Lord Barnard's committee of the House of Lords began the hearing of the Birkenhead Corporation Bill, which sought powers to run omnibuses in the borough and certain adjoining districts. The committee suggested that the Corporation representatives might consider whether they would be prepared to agree to the inclusion of a clause similar to that agreed upon in the recent Manchester Bill, under which it would be necessary for the Corporation to obtain consent, upon terms, from the county and local authorities outside the present Birkenhead boundaries before starting a service of motor omnibuses in the outside areas. A suggestion had been made by counsel for Cheshire County Council and three District Councils that the desired clause should operate so that the consenting authorities could require the Corporation to contribute to preparing the roads for the traffic, including widening, and to the expense of maintenance.—On May 15 Mr. Solly, chairman of Birkenhead Parliamentary Committee, said the Corporation would be willing to make a contribution, as had been agreed in other towns, of three-eighths of a penny per car-mile.—The committee decided that the circumstances differed from those of Manchester, and therefore they were not prepared to grant the Manchester clause here.—Mr. C. Clarke, the tramways manager, said a census showed that a great amount of heavy mechanically-propelled traffic passed over the routes. He estimated there would be a profit on each route. Replying to a suggestion by Mr. Wedderburn that if the Corporation paid ½d. per car-mile, the road authorities not being inclined to accept ¾d., the estimated profit would be wiped out, witness said that even if there was a loss it would be more than covered by the feeding which the omnibuses would give to the tramways.

On May 15 Mr. A. R. Fearnley, formerly tramway manager at Birkenhead, speaking from experience in Sheffield, expressed the opinion that the services could be satisfactorily worked in connection with the tramways, that they would be largely used, and that the roads were suitable. 9d. per mile had proved sufficient for working and capital costs in Sheffield, where the roads were heavy. The roads around Birkenhead were more favourable. If a contribution had to be given towards the cost of roads, ¾d. per mile was sufficient.—Evidence was given on May 18 by the Birkenhead borough surveyor that the county roads should be tar-macadamised. The town roads over which the vehicles would travel were waterbound macadam, tar-sprayed annually, and were suitable for the proposed traffic. The offer of ¾d. per omnibus-mile was sufficient. Evidence in opposition to the bill was given by representatives of the London and North Western, Great Western, and Wirral Railway Companies, Mr. W. Holland, Cheshire county surveyor, and Mr. H. T. Wakelam, Middlesex county surveyor. Mr. Holland said that 20 services of omnibuses were now running in Cheshire over 120 miles of road, many of the services being probably experimental. That also seemed to be the proposition in the case of Birkenhead. He gave particulars of the increased cost of the roads entailed by self-propelled vehicles, and estimated that the increased cost on some of the routes to be used by the Corporation would be 1d. per car-mile and on others 2·47d. per car-mile. It was unfair that these powers should be granted.—The Chairman: Surely the public interest has to be considered. Witness: Yes, but a reasonable contribution should be made towards the cost of the damage.—In reply to Mr. Lloyd (counsel for the Corporation) witness said the 20 omnibus services already running contributed nothing, but the County Council were pressing the Government to put matters on a more equitable basis.—Mr. Wakelam, in cross-examination, said that the Middlesex County Council recently asked for a contribution of ¾d. per omnibus-mile from omnibuses using a proposed new road, but he maintained that that case was not quite analagous with the Birkenhead bill.—Representatives of three local authorities having been heard, Mr. Lloyd said the Corporation objected to the outside authorities being given an absolute veto, and he asked the committee to fix the contribution without stipulating that there should be arbitration.—The Committee allowed the Bill to proceed on the insertion of a clause suggested by Mr. Vesey Knox on behalf of the County Council. This renders the consent of the County Council and the local authorities necessary before the omnibuses can be run outside the borough, such consent not to be unreasonably withheld. Failing agreement an Arbitrator is to decide the question of the amount of contribution to be paid by the Corporation towards road maintenance.

LONDON TRAFFIC CONTROL.

In the House of Commons on May 18, Mr. McKenna, the Home Secretary, in replying to an inquiry from Mr. Kellaway, as to which of the recommendations of the Select Committee on Street Traffic Accidents had been carried out, stated that the Commissioner of Police had taken active steps to secure the carrying out of those recommendations of the Select Committee affecting the safety of the public which could be dealt with under existing powers. He had been in constant communication with the borough councils as to the provision of new refuges, and 58 refuges had been put up during the present year. Additional police had been employed on traffic duty, and the question of stopping places for tramcars and omnibuses was now being dealt with as recommended in paragraphs 116 and 117 of the Committee's report.

The Home Secretary also stated that: "Tramway authorities and managers of omnibus companies have been approached with a view to learning whether they are willing to submit their running time-tables to inspection."

We are informed that the whole of the tramways authorities in the Metropolitan area have unanimously decided not to comply with the request which has been made to them by the Commissioner of Police to submit their time-tables for inspection. One of the grounds—among others—for arriving at the decision stated, is, we understand, that tramways are operated under statutory powers, and, as such, are therefore under the control of the Board of Trade.

Chars-a-bancs for South Lancashire Tramways Company.—Important developments are anticipated in connection with the South Lancashire Tramways Company, who are credited with the intention of running a fleet of motor chars-a-bancs.

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MOTOR OMNIBUS OPERATION.

WORKING COSTS AT WARRINGTON.

The accounts of the motor omnibus department of the Warrington Corporation, of which Mr. J. Telfer is manager, cover the period from July 3, 1913, to March 31, 1914. The full particulars which the Corporation have given will be read with interest, especially as the exact costs of motor omnibus working are in so many cases not available. As will be seen from the particulars appended, the total working costs have been 7·636d. per omnibus-mile, and the average receipts amounted to 9·261d., leaving a balance of 1·625d. The Corporation organised the motor omnibus department under the Warrington Corporation Act, 1911, when borrowing powers to the amount of £5,000 for a period of five years were granted. So far £2,837 have been expended, leaving borrowing powers to the amount of £2,163 unexercised. The following is a statement of income and expenditure:

INCOME.

	Average per 'Bus-mile.* d.	£ s. d.
Passenger receipts	9·261	2,282 13 4
Miscellaneous	·020	5 1 3
Total revenue	9·281	£2,287 14 7

* The total mileage was 59,154·11 miles.

EXPENDITURE.

	Average per 'Bus-mile. d.	£ s. d.
Traffic Expenses:		
Wages of drivers and conductors	2·049	505 4 2
Cleaning and oiling omnibuses	·243	59 17 3
Lighting omnibuses	·145	35 12 6
Fuel, light, and water for garage	·020	5 0 0
Ticket check	·053	12 19 0
Uniforms and badges	·126	31 1 1
Licences	·118	29 3 0
	2·754	678 17 0
General Expenses:		
Rents	·060	15 0 0
Rates and taxes	·030	7 4 10
Printing and stationery	·111	27 7 8
Accident insurance and compensation	·422	104 1 5
Fire and other insurances	·055	13 9 7
Miscellaneous	·059	14 9 10
	·737	181 13 4
General Repairs and Maintenance:		
Buildings and fixtures	·026	6 8 3
Workshop, tools, and sundry plant	·039	9 8 11
Omnibuses:		
Chassis	·548	135 2 0
Tires	·819	201 15 9
Bodies and fittings	·034	8 15 3
	1·466	361 10 2
Power Expenses:		
Cost of petrol	2·679	660 5 2
Total expenditure	7·636	1,882 5 8
Balance transferred to net revenue account	1·645	405 8 11
	9·281	£2,287 14 7

STATISTICAL INFORMATION.

Type of 'bus (two-deck)	Petrol-electric
Horse-power per 'bus	40
Seating capacity per 'bus	34
Number of 'buses	3
Length of routes—	
Gorsey Lane	miles 1·250
Bewsey circular	„ 2·375
Traffic revenue	£2,283
Total revenue	£2,290
Working expenses	£1,882
Interest on capital	£71
Sinking fund	Nil
Net balance	£337
'Bus-miles	59,154·6
Passengers carried (contracts estimated)	618,139
Gallons of petrol consumed	11,646
Cost of petrol per 'bus-mile	2·694d.
Average number of 'buses in use per day	2
Percentage of working expenses to receipts	82·25
Average traffic revenue per 'bus-mile	9·259d.
Average total revenue per 'bus-mile	9·281d.
Average 'bus-miles per day per 'bus	109·141
Average speed per hour	6·944
Average 'bus-hours per day per 'bus	15·716
Average working expenses per 'bus-mile, excluding cost of petrol	4·957d.
Average working expenses per 'bus-mile, including cost of petrol	7·636d.
Scale of fares—	Adults. Children.
Gorsey Lane	1d. ½d.
Bewsey circular	1d. ½d.
Average fare paid per passenger	·886d.
Average number of passengers per 'bus-mile	10·5

BIRMINGHAM CORPORATION OMNIBUSES.

The motor omnibus accounts of the Birmingham Corporation omnibuses, which is issued with the accounts of the tramways department, show that £7,515 has been expended in providing those vehicles, which began running on July 19, 1913. The revenue account to March 31 last was:

Expenditure.	Avg. per 'bus-mile.	£
To Petrol	2·566d.	1,407
Superintendence	·360d.	197
Traffic expenses	3·132d.	1,717
General expenses	·608d.	333
Repairs and maintenance	2·622d.	1,438
Total expenditure	9·288d.	5,092
Balance carried to profit and loss account	——	1,683
		£6,775
Income.	Avg. per 'bus-mile.	£
By Traffic receipts	—	6,761
Other receipts	—	14
	12·357d.	£6,775

The omnibuses carried 748,500 passengers and ran 129,847 miles, besides 1,743 miles for testing purposes.

MOTOR TOWER WAGON ADVANTAGES.

Mr. H. Pilling, general manager, Accrington Corporation Tramways, has reported that the motor tower wagon, which was delivered in January last, has already proved to be of considerable advantage over the horse-drawn vehicle, as it reduces to a minimum the inconvenience to the public stoppage in the car service, and consequent loss of revenue.

Mr. W. Clough, in his annual report on Bury Corporation Tramways, says: "During the year a motor tower wagon has been purchased from Leyland Motors, Limited. It is a 30-H.P. machine, gear driven, and with a carrying capacity of 3½ tons. The cost was £700, and it is proving of great service in dealing with breakdowns, and by reducing the time previously spent by the workmen in travelling to and from the places where ordinary repairs are being executed."

DUNLOP SOLID TIRE DEPARTMENT.—In consequence of the rapid increase in their solid tire business, the Dunlop Rubber Company, Limited, of Manor Mills, Aston, Birmingham, have appointed Mr. W. J. McCormack, of Frome, to the position of assistant manager of their solid tire department. Mr. W. H. Paull controls this side of the company's business.

LEYLAND'S ISSUE OVER SUBSCRIBED.—200,000 six per cent. cumulative preference shares in Leyland Motors (1914) were issued early in May for public subscription. The issue was over subscribed. The total capital of the company is £400,000. 200,000 ordinary shares of £1 were allotted to the vendors as part payment of the purchase price of the well-known business of Leyland Motors, Limited, makers of motor vans, lorries, fire engines, etc. The purchase price was £300,000.

PETROL CAR OPERATION AT STIRLING.—In order to compete with motor vehicles the Stirling and Bridge of Allan Tramways Company last year introduced a petrol car on their tramways, which are worked by horses. They intend to apply for a Provisional Order to authorise a permanent system of petrol cars over the whole of the tramways in the event of no agreement being arrived at by the several local authorities for an installation of an electric tramway system from Bridge of Allan to Bannockburn.

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MOTOR TRAFFIC NOTES.

DAIMLER COMPANY, Coventry, have received an order for six 2½-ton lorries for the British Petroleum Company.

ELECTRICALLY-DRIVEN COAL WAGONS.—Messrs. Greenshaw and Peers, of Bolton, have received a contract from Southend Council for three electrically-driven coal wagons, at £303, to be worked between the pier and the power-station.

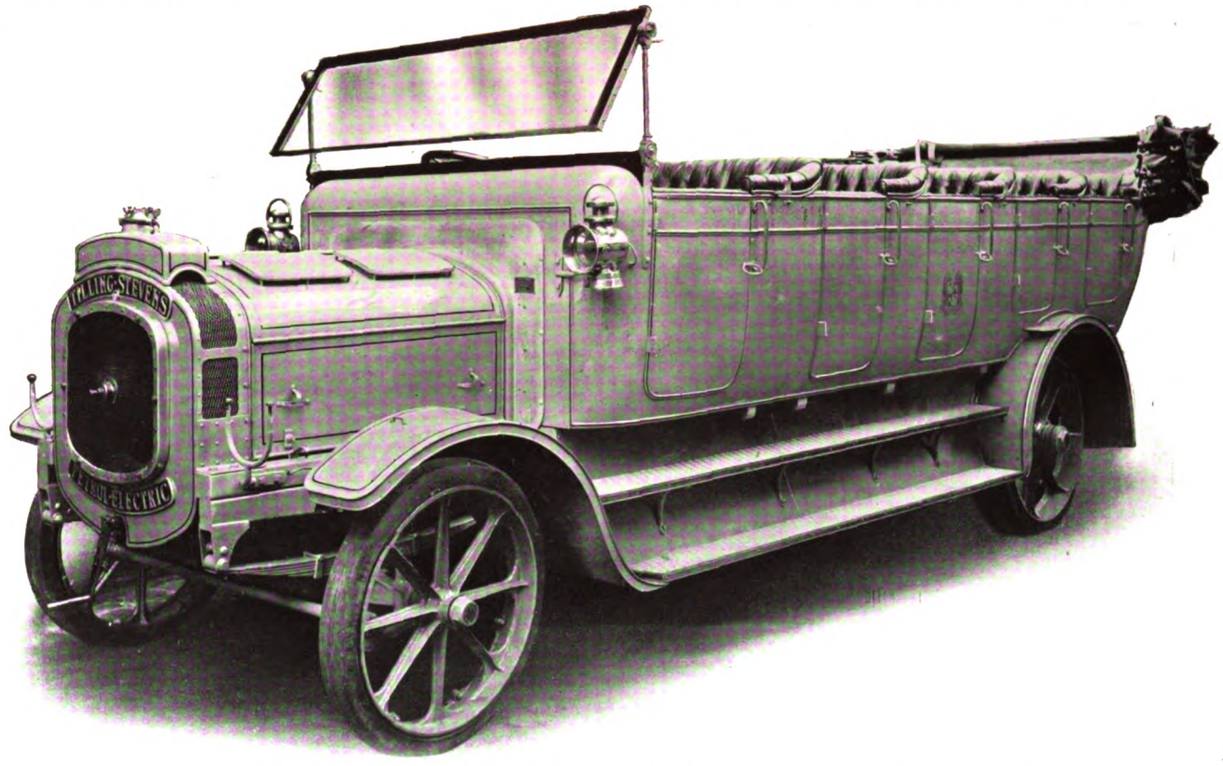
CHAS. MACINTOSH AND COMPANY, LIMITED, have received a contract from the London General Omnibus Company for tires for 600 omnibuses operating on surfaces ranging from the smooth pavements of central London to the macadam roads of rural localities.

OMNIBUS SERVICE FROM DONCASTER.—The Tramways Committee have arranged with Mr. P. H. Marco, general manager of Barnsley and District Electric Traction Company, with regard to the licensing of motor omnibuses to ply for hire between Doncaster and Goldthorpe by way of Hickleton and Marr.

LONDON OMNIBUS OWNERS AND TRAMWAYS.—Reporting upon the new tramway schemes recently considered by the House of Commons Committee, the Parliamentary Committee of the London County Council on May 19 mentioned that the expenses of frontagers who opposed a tramway scheme from Lee Green to Eltham were paid by the London Omnibus Owners' Federation.

TROLLEY AND MOTOR OMNIBUS SCHEMES FOR WALSALL.—The General Purposes Committee have recommended that powers be obtained in the Corporation bill, now being promoted in Parliament, for extending the proposed trolley vehicle and motor omnibus route from Cannock as far as Hednesford, an additional distance of 2⅛ miles, involving an additional capital expenditure of £7,000.

KARACHI TRAMWAY COMPANY'S OMNIBUSES.—The Karachi Tramway Company have started a service of single-deck omnibuses. In consequence of the rival omnibus, which preceded the institution of the company's vehicles, having collided with a tramcar, the authorities have prohibited omnibuses plying for hire on the tramway routes. The new service is expected to lead to a development of the suburbs.



40-h.p. Petrol-Electric 20-Seat Tilling-Stevens Char-a-Bancs for Durban Municipality.

NO TAX ON HEAVY MOTOR VEHICLES.—In the House of Commons on May 15 the Home Secretary stated that the Government did not propose to impose a tax upon motor omnibuses and other heavy motor vehicles which caused expense to local authorities by breaking up the roads, but he said the whole subject was under consideration.

OMNIBUSES FOR LEICESTER.—The Corporation have accepted the tender of the Daimler Company, Limited, for three omnibus chassis at £550 each, and of Christopher Dodson, Limited, of London, for the bodies at £212 15s. each, the additional cost of tires, accessories, spare parts, etc., being estimated at about £200 for each vehicle.

BOKSBURG RAILLESS TRACTION.—With reference to the notice in our issue of May 7, describing the inauguration ceremony of the railless traction system at Boksburg, we are requested by the contractors, the R.E.T. Construction Company, Limited, to state that the contract was arranged through their agent, Mr. Herbert Ainsworth, of Johannesburg.

FROM MAIDSTONE TO HASTINGS.—An enterprising firm at Maidstone recently inaugurated a daily service between that town, Hawkhurst, Robertsbridge, Battle, and Hastings, at a return fare of 4s. 6d. for the full journey. The route being a direct one, the distance is less than by railway, while the fare gives a considerable saving. The single journey occupies three hours.

MOTOR TRAIL VAN REGULATION.—In the House of Commons on April 22 Sir Charles Henry asked the President of the Local Government Board if he would consider restricting the number of trucks and the weight drawn by motor or steam engines using the public roads? Mr. Herbert Lewis replied that the matters referred to were already subjects of considerable restrictions, but his right honourable friend would be happy to consider any suggestions which might be made.

DENNIS BROTHERS (1913) LIMITED, of Onslow Works, Guildford, have secured an order from Surrey County Council for three 5-ton tipping wagons for their roads department. A similar 5-ton tipping wagon is being supplied to the Hambledon Rural District Council. Dennis Brothers are receiving numerous orders for chars-a-bancs, and there has been a substantial increase in their deliveries for the past three months, as compared with the corresponding period last year.

MUDGUARD FOR OMNIBUSES.—Representatives of London Municipal Councils recently witnessed a demonstration of the Graveley mud-guard, given by the company formed for the purpose of forwarding that invention. On a specially-prepared section of road in Halton Road, Islington, canvas screens were set up to show the effect of the splash-guard. They remained practically clean after the omnibus with the guards had passed, but a shower of mud bespattered them when the guards were removed.

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MOTOR TRAFFIC.

PROPOSED OMNIBUS SERVICE AT ACCRINGTON.—A proposal is to be considered by the Corporation for instituting an omnibus service to Spring Hill and Higher Antley.

LEICESTER AS AN OMNIBUS CENTRE.—Licences have been granted by the Leicester Watch Committee to the Market Harborough Motor Traction Company to run omnibuses between Leicester and Market Harborough, and to occupy a stand.

AN EAST COAST DEVELOPMENT.—Efforts are being made by the United Automobile Services, Limited, to establish an hourly service of omnibuses between Yarmouth, Lowestoft, and Southwold. Licences have been obtained for running in Yarmouth. For many years the Great Eastern Railway Company have run motor omnibuses between Lowestoft and Southwold.

AN EDINBURGH CHAR-A-BANCS. The illustration below represents a 35-H.P. char-a-bancs recently delivered by Halley's Industrial Motors, Limited, to White's Motor Hiring Company, of Edinburgh. The vehicle has seats for 30 passengers, and is a good example of the torpedo type body.

Halley 35-h.p. Char-a-Bancs, at Edinburgh.

LONDON OMNIBUSES ON HIRE.—Two hundred motor omnibuses of the London General Omnibus Company were engaged on the occasion of the football cup tie at the Crystal Palace by visitors to London, in order to view the sights of the Metropolis and to journey to the scene of the match. A large number of these vehicles were also hired for the Derby race at Epsom on May 27.

ALCOHOL FUEL COMMITTEE.—On the ground that the production of suitable engines appears to be the most important side of the question of securing an alcohol fuel substitute, the Commercial Vehicles Committee of the Society of Motor Manufacturers and Traders have expressed their opinion in favour of the society being given additional representation on the Alcohol Fuel Committee of the Imperial Motor Transport Council.

ROAD MOTOR DEPARTMENT OF THE LONDON AND NORTH WESTERN RAILWAY.—The development of the road motor vehicle department of the London and North Western Railway has necessitated greater attention being given to the mechanical and commercial supervision of the department. In all there are 111 such vehicles, made up of 47 passenger conveyances, 25 goods carriers, 27 parcel vans, four steam wagons, four carriers, and four broughams. Mr. F. W. Dingley has been appointed to the new post of superintendent.

WAR OFFICE SUBSIDY VEHICLE TRIALS.—The Mechanical Transport Vehicle Committee of the War Ofice have awakened to the need of using up-to-date methods for bringing their scheme of subsidising approved motor vehicles to the attention of business men. All who were interested in the scheme, together with newspaper representatives, were invited to follow the progress of the first of the trials held during the first half of May, when vehicles by the Leyland, Commer Car, Maudslay, and Thornycroft Companies and Dennis Brothers were being tested. Types of the vehicles which had passed last year's tests were also on view.

SEVENTEEN PETROL-ELECTRIC CARS FOR HASTINGS.—The total number of the Hastings and District Tramway Company's cars which are to be converted to petrol-electric traction for service on the sea front between Hastings, St. Leonards, and Bexhill is 17. On May 12 a sufficient number of cars had been received from W. A. Stevens, Limited, of Maidstone and London, to enable the through service to be resumed. Since the abandonment of the surface contact system on the Hastings Esplanade passengers have had to change from the petrol-electric cars at West St. Leonards into the overhead trolley cars. It is expected that the whole of the conversions will be completed in time to enable the company to deal fully with the summer traffic, from which the greater portion of the dividend is earned.

AN ATTRACTIVE FIELD FOR THE MOTOR OMNIBUS.—Mr. G. F. M. Cornwallis-West, presiding on May 18 at the annual meeting of the Potteries Electric Traction Company, said that the Potteries district with its scattered townships and villages, offered an attractive field for motor omnibus services. During the year their fleet had been increased from 14 to 22 vehicles. If their negotiations with Stoke Corporation for an extension of their lease of the tramways were successful, at least £35,000 would require to be expended on doublings, extension of loops, and new rolling stock. The new capital required would be able to earn the interest easily, especially as the company had embarked on a motor omnibus undertaking, which as far as they could judge now seemed to be a healthy part of the company's properties.

EAST HAM COMPETITION ENTAILS A TRAMWAY RATE.—East Ham Council have agreed to a rate of 1½d. in the pound to make up the deficiency of £5,500 in the tramway account for the past year, to which had also to be added a deficit of £1,200 for the preceding year. £3,000 of the shortage will be made good by appropriating the whole of the reserve fund. The chairman of the Finance Committee informed the Council at their last meeting that in the past the tramways had contributed a total of 8d. in the pound in relief of rates. Many members had been against the excessive sums devoted to that purpose. The deficit was due to motor omnibus competition, which matter he thought would have to be discussed and dealt with on the lines that commercial undertakings using the main roads and cutting them up should contribute to the cost of such wear.

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THE

Tramway & Railway World

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ANNUAL SUBSCRIPTION (Postage Prepaid)—in the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF BOLTON.

ELECTRICITY DEPARTMENT.

The Electricity Committee of the County Borough of Bolton invite tenders for the supply, delivery, and erection of the following plant:—

Converting Plant.
Sub-station E.H.T. and H.T. Switchgear.

Specification and form of tender may be obtained from Mr. W. J. H. Wood, Borough Electrical Engineer, Spa Road, Bolton, on receipt of a deposit of one guinea for each contract, which deposit will be returned on receipt of a *bonâ-fide* tender.

Additional copies of the specifications may be obtained on payment of a further fee of five shillings per copy, which will not be returned.

Tenders must be sealed and endorsed "Tender for ————," addressed and delivered to "The Chairman of the Electricity Committee, Electricity Works, Spa Road, Bolton," not later than 9 a.m., Thursday, July 9, 1914.

The acceptance of any tender will be subject to the sanction of the Local Government Board being granted for the necessary loan.

The Corporation do not bind themselves to accept the lowest or any tender.

SAMUEL PARKER,
Town Clerk.

Town Hall, Bolton,
June, 1914.

LONDON INDIA OFFICE.

The Secretary of State for India in Council is prepared to receive tenders from such persons as may be willing to supply—

Switches and Crossings.

The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at that Office by 2 o'clock p.m. on Tuesday, June 30, 1914, after which time no tender will be received.

H. J. W. FRY,
Director-General of Stores.

India Office, Whitehall,
June 10, 1914.

COUNTY BOROUGH OF WALLASEY.

TENDERS.—PETROL MOTOR WAGON AND TRAILERS.

The Works Committee of the Corporation of Wallasey are prepared to receive tenders for the supply of a Petrol Motor Wagon, Trailers, and Street Watering Tank.

Particulars may be obtained on application to Mr. W. H. Travers, A.M.I.C.E., Borough Engineer and Surveyor, 18, Falkland Road, Wallasey.

Tenders, in sealed envelope, endorsed "Motor Wagon, etc.," to be forwarded to the undersigned not later than Tuesday, the 30th inst.

By order, H. W. COOK.
Town Clerk.

Town Hall, Wallasey,
June 5, 1914.

COUNTY BOROUGH OF CROYDON.

PETROL MOTOR AMBULANCE.

Notice is hereby given that the Council are prepared to receive tenders for the supply of One Petrol Motor Ambulance.

Forms of tender and conditions may be obtained upon application at the Borough Engineer's Office, Town Hall, Croydon, upon depositing one guinea, which will be returned upon receipt of a *bonâ-fide* tender.

Tenders, on the prescribed form, to be sent to me by 11 o'clock in the forenoon on Thursday, the 25th day of June, endorsed "Petrol Motor Ambulance."

Tenders will only be received subject to the terms of the draft contract deposited at my office, which may be inspected during office hours.

The Council will not be bound to accept the lowest or any tender.

JOHN M. NEWNHAM,
Town Clerk.

Town Hall, Croydon,
June 9, 1914.

COUNTY OF LONDON.

The London County Council invites tenders for the supply of (a) 10,000 Driving and Pony Wheel Tramcar Tyres or alternatively 5,000 Driving and Pony Wheel Tyres; (b) 300 Axle Forgings for tramcars; and (c) 150 sets of Plough Collector Gear. Particulars, form of tender, and conditions of contract may be obtained from the Chief Officer, London County Council Tramways, 62, Finsbury Pavement, E.C.

The person whose tender is accepted will be bound by the contract to pay wages at rates not less, and to observe hours of labour not greater, than the rates and hours set out in the Council's list. Particulars of the Council's Standing Orders as to its conditions of tender and contract are given in every issue of the *London County Council Gazette*. No tender received after 11 a.m. on Tuesday, June 30, 1914, will be considered. The Council does not bind itself to accept any tender.

LAURENCE GOMME,
Clerk of the London County Council.

County Hall, Spring Gardens, S.W.,
June 9, 1914.

ELECTRIFICATION OF MELBOURNE SUBURBAN RAILWAYS.

The Agent-General for Victoria is prepared to receive tenders for the supply and delivery in Melbourne of

Electrically Operated Car Shed Cranes

for use in connection with the electrification of the Melbourne Suburban Railways now being carried out.

Specification and form of tender may be obtained from Messrs. Merz and McLellan, Consulting Engineers, 32, Victoria Street, Westminster, S.W., on or after Monday, the 15th of June, 1914. Any *bonâ-fide* tenderer requiring information in addition to that contained in the specification may apply to Messrs. Merz and McLellan.

The charge for the specification in duplicate is £5 5s. and £2 2s. each for any further copies. Sums paid as above will be refunded on receipt of a *bonâ-fide* tender for the whole of the works included in the specification. The cheques, which must accompany applications for the specifications, are to be crossed and made payable to the Agent-General for Victoria.

Sealed tenders, marked "Electrification of Melbourne Suburban Railways—Tenders for Electrically Operated Car Shed Cranes," are to be addressed to the Agent-General and delivered at his office, Melbourne Place, Strand, W.C., not later than 12 noon on July 6, 1914.

The Government do not bind themselves to accept the lowest or any tender, and ample security will be required from the contractor whose tender is accepted.

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CITY OF MANCHESTER.

The Electricity Committee of the Manchester Corporation invite tenders for the supply of the following :—

(*a*) Potential and Current Transformers.
(*b*) Continuous and Alternating Current Motors.
(*c*) Electricity Meters.
(*d*) Continuous Current Motor Starting Switches and Three-phase Star Delta Switches.

Specifications and forms of tender may be obtained on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester, on payment of a fee of one guinea for each specification, which amount will be refunded on receipt of a *bonâ fide* tender.

Further particulars and information may be obtained from Mr. S. L. Pearce, Chief Electrical Engineer, Dickinson Street, Manchester.

Tenders, duly endorsed and addressed to the Chairman of the Electricity Committee, must be delivered at the Town Hall, not later than 10 a.m. on Friday, the 26th inst.

The Corporation do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester,
June 9, 1914.

VICTORIAN STATE RAILWAYS.

The Agent-General for Victoria, Australia, invites tenders for the supply and delivery at any of the Railway Piers at Williamstown, Melbourne, fully inclusive of the Australian Customs duties, etc., of the following :—

345 Tons of 90/92 lbs. Steel Tram-Rails, to be delivered in Melbourne by August 31, 1914.

Specification, form of tender, and contract conditions may be had by *bonâ fide* tenderers on application at the offices of the Consulting Engineers, John Coates and Co., Limited, 115, Victoria Street, London, S.W.

Tenders must be delivered to the Agent-General for Victoria, Melbourne Place, Strand, London, W.C., not later than 12 noon on Wednesday, June 24, 1914, marked "Tender for Tram-rails."

A preliminary deposit equal to ninepence for each and every ton of rails must accompany each tender.

The lowest or any tender not necessarily accepted.

PETER MCBRIDE,
Agent-General for Victoria, Australia.

(Continued on page 499.)

READING CASES
To hold 26 Saturday Issues of
"THE TRAMWAY AND RAILWAY WORLD,"
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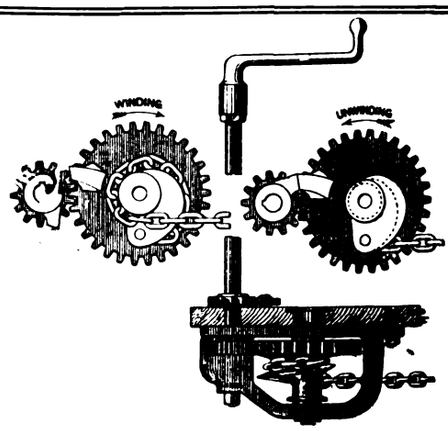

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(2) Stopping the drum always at the point from which recovery of chain is most rapid;
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THE
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SATURDAY, JUNE 13, 1914.

THE "OCEAN"

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MOORGATE STREET LONDON, E.C.

THE LONDON RIVALRY.

The results of the last financial year of the London County Council tramways seem to suggest that the department have done all that is possible in the way of meeting the omnibus competition by making a penny reduction on double journey fares and issuing a convenient return ticket on single fares of 2d. upwards. These concessions have had a year's trial, and although there has been an increase in the number of passengers, and the upward tendency continues, it is unlikely that the improvement will attain such an extent as to obviate the necessity of taking from the reserve fund the sums required to meet the cost of renewals of permanent way and rolling stock. Unless the unexpected happens it is possible to name the year in which a call will have to be made upon the ratepayers to meet those charges, which have been increased by the growth of heavy motor traffic. Apart from relieving the tramways from some of their legislative burdens, there are apparently only two ways by which the undertaking may perhaps be made to meet all its liabilities, and one is concomitant with the other. The department must be given power to resort to advertising in the sense that it is understood by their rivals and also by successful commercial enterprises. Space must be purchased in the newspapers, and skilled writers must be given the task of filling it. For the tramways department to be deprived of that advantage is tantamount to an army engaging in war without the aid of flying machines. At present the tramways are restricted to the use of placards on the cars and at the depôts bearing the inscriptions, "Take return tickets" and "Take the tram." Their opponents use big spaces in the newspapers for well-displayed traffic announcements which do undoubtedly induce business. Has it ever struck the Highways Committee that the public must be told why their suggestions should be complied with? The latest move of the allied companies is to point out the cheapest means of making single journeys from inner London to the suburbs by the joint use of the underground railways and the omnibuses. There is another all-important task that the tramways department must face in an advertising campaign. The fact must be brought home to the pubic that the undertaking is a municipal one. To thousands the initials "L.C.C." on the sides of the cars are meaningless. If it were not so there would be many persons who would use the cars instead of the omnibuses. The women who invade the latter vehicles on shopping journeys, and the working classes who imagine that because they escape the visitations of the rate collector they do not pay rates, must be made to understand that every penny they hand to an omnibus conductor is hastening the day when the tramways will become a charge upon the rates. The arrival of that period, combined with a continuance of the sums levied during the past two years for the provision of wood-paved roads for omnibuses, will mean higher rates. Stress must be laid upon the fact that owners of working-class property will pass the burden on to their tenants by an increase of rents. It is satisfactory to note that the department are now seeking to foster traffic by increasing the usefulness of the cars. The issue a few months ago of transfer tickets for return fares has been followed by penny transfers in order to abolish the need for waiting for particular cars.

AIDS IN BREAKDOWNS AND TRACK REPAIRS.

Although motor vehicles of the heaviest type are causing an increase in track maintenance costs by the crushing and loosening of setts, necessitating, among other improved methods, the use of bitumen as a binder, there are directions in which these machines can be made to render great engineering and other service to tramway undertakers. The utility of motor conveyances, when used for opening up new routes, is shown in the remarks made by the chairman of Coventry Tramways Committee in placing before the Corporation the results of the second year's working of the undertaking. From Councillor Pridmore's observations it appears that on one route the car service was showing unsatisfactory results, but the introduction of omnibuses gave improved receipts. As a consequence the car service is being reduced, and doubtless when the self-propelled vehicles have brought the traffic up to a certain point it may be left to the cars to carry. Then the omnibuses can be removed to one of the other localities that are calling for means of locomotion. Motor vehicles other than omnibuses afford great help in the subsidiary work of tramway undertakings; as tower and breakdown wagons they are of immense assistance. The past year has witnessed a great extension of the use of such motor auxiliaries, and testimony to their usefulness is forthcoming in the annual reports of managers. Last week we quoted from the remarks of the Accrington manager to the effect that the motor wagon reduces to a minimum the inconvenience to the public and the consequent loss of revenue. The Bury manager, too, observed that his vehicle is not only proving of great service in dealing with breakdowns, but is reducing the time formerly spent by the workmen in travelling to and from the places where ordinary repairs are being executed. The latest testimony is from South Shields, where, the manager states, the machine "has even exceeded expecta-

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tions, and has enabled a much greater amount of work to be carried out on the overhead lines in considerably less time. Also the liability of delay through breakdowns is greatly reduced, as the vehicle is always ready to turn out, whereas formerly as much as three-quarters of an hour frequently elapsed before a horse could be obtained." Recently the manager of Ilford tramways bought a repair wagon, worked by Edison accumulators, and during the past few weeks a number of other undertakings have ordered battery-propelled chassis for the same purpose. These are peculiarly fitted for this sphere of work, and with power always available from the generating station the cost of running should show a considerable saving compared with petrol. The example of these Corporations should render it an easy matter for their electricity undertakings to encourage the use of battery vehicles among private users. Petrol wagons have for years been utilised by the London County Council and the London United Tramways, among others, for the conveyance of the men who remove obstructions. As recently reported in our columns, the Council, who have not the same facilities for using tramway trucks as are available in the provinces, have purchased six steam wagons and two petrol wagons for the conveyance of materials in connection with the repair and renewal of the permanent-way. It is estimated that, apart from more speedy distribution, this outlay will effect an annual saving of £1,525 by the displacement of at least forty horses and carts. The six five-ton steam wagons are to have rubber tires, and it is to be hoped that in the near future the use of such tires will be made compulsory.

PRIVATE BILL LEGISLATION.

Glasgow.—Lord Ribblesdale's Committee of the House of Lords, on June 9, resumed consideration of the corporation's application for powers to erect a new bridge over the Kelvin and to construct tramways across it. The object of the scheme is to afford an outlet from North Kelvingside to the city and the docks A proposed new road would go through the grounds of Queen Margaret College. The Corporation were prepared to give £10,000 for the 2,400 yards of ground they required, to give the College 10 years in which to find a new building, or to let so much of the College as they wanted for that period. Neither of these offers had been accepted. Witnesses were examined on both sides. The hearing proceeded until June 11, when the committee adjourned until next week.

Newcastle-on-Tyne.—A committee of the House of Commons, presided over by Sir J. Barran, on June 10 began the hearing of the City Council's Bill asking for powers to construct and work tramways from the city boundary to Longbenton and Forest Hill; a short length of tramway intended chiefly as a stand-by to facilitate traffic to Gosforth Park racecourse; to run trailer and coupled cars with the assent of the Board of Trade; to reserve cars for special purposes and to charge special tolls with a maximum fare of 1s.; and to run motor omnibuses to Longbenton. In connection with the latter scheme an agreement had been arrived at to pay ⅜ of a penny per vehicle mile. Gosforth Council objected to trailer cars, through cars and special cars, the owners of an estate opposed the laying of tramways at Killingworth, and the North Eastern Railway opposed both the tramway and omnibus schemes. After hearing evidence in support of the Bill the committee on June 11 adjourned until Tuesday next, the committee being unable to sit yesterday owing to a member's "long-standing engagement."

Sheffield.—On June 10, Mr. Middlebrook's committee of the House of Commons resumed consideration of the Corporation's Bill seeking powers to run motor omnibuses in districts outside of the city. Mr. A. R. Fearnley, cross-examined by Mr. Ram (for Derbyshire County Council) said the Corporation expected to run over about ten miles of Derbyshire roads. One route might necessitate a considerable amount of road improvement, but that was not a matter for the omnibuses. The cost of that must be undertaken by the road authority. He admitted that Chesterfield Corporation were put under an obligation to contribute to the maintenance of the roads over which their omnibuses run, but in the present instance he claimed that there would be no exceptional traffic which would justify any such contribution. In Derbyshire there were twenty different motor services run by private owners with no payment towards the roads beyond the payment of the petrol tax.—Sir Wm. Clegg, chairman of the Tramways Committee, said the Corporation's tramway undertaking was primarily for the benefit of the public, and not to make money. The omnibus services were only reasonable extensions of the tramways undertaking.—Representatives of local authorities gave evidence of the demand for the services. The Corporation's case concluded on June 11, when Mr. Hatfield, the highways surveyor, stated that his experience with motor omnibuses was that on tar-sprayed roads the damage was so little that he had not carried out the original intention of laying tar-macadam. A number of the county roads out of Sheffield were not good enough for present-day traffic; and before there was any question of these omnibus routes the County Council had decided to lay tar-macadam on some of these roads on account of the heavy motor traffic. The committee will sit again next Tuesday.

York.—The resumed consideration of the City Council's Bill began on June 9, powers being asked for to provide and run railless trolley vehicles, motor omnibuses, and to make further provision with regard to the light railway, electricity and other undertakings. The North Eastern Railway objected to the termination of the railless trolley routes in front of the station, contending that the space was already congested. They were also apprehensive that the Council might wish to stop their omnibuses in front of the station, which would interfere with their traffic along a route from which the tramways had been restricted. The object of the Council in running omnibuses was to ascertain where the traffic really was before going to the expense of constructing tramways.—Evidence in support of the Bill was given by Alderman Meyer, chairman of the Tramways Committee, Mr. J. W. Hame, tramways manager and electrical engineer to the Corporation, Mr. C. J. Spencer, tramways manager of Bradford, where the Corporation was one of the first to obtain powers for the running of trolley vehicles, and the Chief Constable. It was stated that it would take about 10 seconds to turn a trolley car, or about the same time as was required to turn a motor omnibus.—For the company two officials suggested that the cars should drop passengers at the station and go to Blossom Street to turn. Col. von. Donop, for the Board of Trade, objected to railless trolley routes in several streets where sections of the road were only 13 ft. 6 in. in width, and varying up to 16 ft. The Board did not raise any objection where the streets were 20 ft. wide. The committee decided to allow the proposed turning place for railless trolley cars outside the station, with the condition that if, in the opinion of the Board of Trade, traffic should become so congested as to make it desirable, the terminus should be removed to another place approved by the Board. As to the motor omnibuses, there would be no restriction.

EXPERTS REPORTS ON BATH TRAMWAYS.

Sir J. Sivewright, the chairman of the company, presiding at the adjourned meeting of shareholders on June 4, to consider proposals for postponing the preference dividends, stated that at the meeting in March he announced that the bankers had practically called up their loan. The weather had since been propitious, and the net revenue of the company had been much in excess of the estimate. The bankers, seeing the earnest manner in which the company had tackled the loan, had expressed willingness to take considerably less in annual payments, and there would be no need to suspend the preference dividend either now or at any future time.

Dr. Moody, one of the committee of shareholders appointed to confer with the board, stated that Messrs. Balfour, Beattie and Co., tramway experts, were asked to report on the system. After considering that report the committee got into touch with the board. The committee had then a suggestion to make with regard to the means of financing the company, but they wished to make sure that the board intended to follow out the suggestions in the experts' report. The committee were of opinion that the energies of the company were being frittered away in running a foundry which cost only a few hundred pounds, but the profits of which were said to amount to 15 or 20 per cent. Without consulting the committee the board asked Mr. J. B. Hamilton, general manager of Leeds Corporation tramways, to give them a report. The committee had refused to consider the matter any further with the board. Messrs. Balfour said that the motor omnibus and motor car traffic had not provided any revenue for the company, but he would go further and say that they were making a very heavy loss. Messrs. Balfour showed that the undertaking was overstaffed.

Mr. T. Rowe, a shareholder, criticised the financial record of the company, and alleged that money had been frittered away in a shop and side shows which took up much time of the manager. He criticised the omnibus department, the amount spent on the vehicles, and their value to-day, and said it could be seen from this what had become of the money.

Mr. Start maintained that the tea shop at the end of the route had improved the traffic, and that the foundry was of great importance to the tramways.

The Chairman, in reply, said it had been alleged that the directors obtained Mr. Hamilton's report because they were frightened at the report of Messrs. Balfour. He had no exception whatever to take to the latter in regard to many points, though he did take exception to the reflection cast on the staff in regard to their traffic experience. Mr. Hardy had been with the company for ten years, and they had succeeded in keeping him when other companies had sought his services. They felt that he was the first man who ought to see Messrs. Balfour's report, and Mr. Hardy, on seeing it, asked the board whether they would allow the staff, at their own expense, to get a report from the very best tramway expert available in Great Britain. Both the reports would be cir-

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culated among the shareholders. Mr. Hamilton, in his summing-up, said :—"Before leaving this section of the report, I desire to put it distinctly on record that, in my opinion, the whole of the assets of the company in the foundry, in the tramways and motor omnibus department, and in parcels and catering, are, except in a few minor points referred to, being maintained in a state of the highest productive capacity by the tramways manager and his staff. Not only are they well maintained, but I am satisfied, after a most searching examination, that the work is being most economically carried out, and, whilst safeguarding the interests of the board and the company, reflects the utmost credit upon all those concerned in the work. I have been engaged in practically all the large valuations of tramway undertakings during the last ten years, whether under Section 43 or as going concerns, and, therefore, can speak with very considerable knowledge as to comparative conditions of maintenance in different undertakings, and have no hesitation in saying that the standard of upkeep in Bath is much above the average and is ample and sufficient, with reasonable renewals from time to time, to guarantee the continuance of the various assets at their highest earning capacity."

MISCELLANEOUS NEWS AND NOTES.

Extensive Schemes at Bradford.—The Tramways Committee recommend that the tramway depôt and workshops should be extended, at an estimated cost of £54,000, and that the tramways be extended from Ann Street to Micklethwaite. The estimated cost of the latter scheme is £15,848.

Burnley Goods Wagon.—Although the goods wagon instituted on the Burnley tramways by the manager ceased to run a regular service on April 30, 1914, owing to the receipts not being satisfactory, it is now run by special request for minimum loads. The system has worked very well, and, adds Mr. Mozley, it is a pity the traders have not given it better support.

Additional Power Plant for Singapore Tramways.—In their report for the past year the directors of Singapore Electric Tramways, Limited, state that to meet the increasing demands for power they have, on the advice of the manager, decided to install additional plant, the chief items of which are :—One 350 kw. Diesel engine and generator (d.c.), two 187 k.v.a. Diesel engines and generators (a.c.), one 125 k.v.a. motor generator (a.c.), and one alternating current switchboard.

The Concessions to London Omnibus Workers.—It is reported that the London General Omnibus Company, while refusing to abolish the mileage system and to pay a regular daily wage, have agreed to further reduce the normal working hours per day, while allowing the increased pay already agreed to to remain. Any alterations in routine are to be notified three days in advance to the men's union, and the employees are to have the right of appeal to the managing director or to the chief engineer.

Co-Operation Between Traction and Lighting Power Stations.—A recommendation has been made to Glasgow Corporation, as the result of consideration of reports from the tramways manager and the electrical engineer, that the Pinkston power station be left under the control of the tramways department, provided that the present arrangements be continued, whereby each department can get, by means of the interconnecting cables between Pinkston and Port-Dundas stations, whatever supply of energy can be spared whenever assistance is required by either department from the other.

Home Office and Assistant Conductors.—Representatives of the London and Provincial Union of Licensed Vehicle Drivers on June 10 waited upon the Home Office and expressed opposition to the granting of licences to youths to act as assistant conductors on the London County Council cars. Mr. Ellis Griffith, in reply, said he thought it fairly clear that the object of the departure was the safety of the public. He pointed to the ever-increasing number of accidents occurring in the metropolitan district to people alighting from tramcars. In 1911 the number was 550, in 1912 588, in 1913 they totalled 1,165, while if the average for the present year were taken the number would come out about 1,300. He promised them that their views would be put before the Home Secretary.

Motorman's Fatal Illness.—At an inquest held on the body of a motorman employed by the Imperial Tramways Company at Middlesbrough the evidence showed that he failed to pull up at several compulsory stops. At a loop he went through instead of stopping, although another car was approaching. The driver of the latter car reversed and called out to the conductor of the uncontrolled car to knock out the switch. Simultaneously the conductor pulled out the switch. Deceased was found in a semi-conscious condition, and he stated that he had had a shock. The lamps denoting leakage were not lit, however, nor was the controller door open. The medical evidence showed that there were no indications of an electric shock, and that death was due to cerebral hemorrhage. Mr. J. Freshwater, general manager to the company, mentioned that the deceased had had an absolutely clean record during his 15 years' service, and he would see that some reward was given to the other motorman and the conductor for their promptitude.

Counting of Conductors' Receipts Late at Night.—In compliance with a promise made by the chairman of Belfast Tramways Committee, the general manager has by ballot ascertained the opinion of the conductors over one year's standing upon the following question :—Do you wish to wait when you come into the depôt, after you have finished duty for the day, while your money is counted, compared with your waybill and tickets, and a receipt given for it? The result was that 216 conductors answered "No" and 43 "Yes." This was a majority of 173 in favour of the present method, or of four to one. In reporting the foregoing result, Mr. Nance adds :—"The cost of the method proposed by Councillor Burke would have been £2,500 per annum; whereas the total average shortage in cash of all the conductors only amounts to about 6s. 6d. per week. There would have been special counting offices required to be built in each depôt, except Sandy Row. I recommend that the committee act in accordance with the wishes of the great majority of the conductors.

Troubles and Achievements of Southport Tramways Committee.—Councillor Richardson, chairman of the Tramways Committee, reported at the May meeting of the Council that on account of the Highways Department having increased from £5 to £25 their charge for steam generated at the destructor the tramways manager had prepared a plan for heating the car shed at a cost not exceeding £25. The cost of upkeep would be £5. The Highways Committee, who were going to throw off their steam to the winds, also broke up the track, threw the pavement back in a temporary way, and, two or three weeks later, asked for an order to repair the track which they had broken up. Formerly there was a wastage of about £500 to £600 on current, but there had been a saving of about £500 during the past six months. Judging by what had been done during the ten months the committee had been in existence he was convinced that with the influx of a large number of visitors the undertaking could be made to pay its way. Councillor Ellison referred to the sum of £323 which had been expended in increases of wages, with the result that the men were driving the cars more skilfully and giving greater care to the overhauling of car equipments.

Keighley's Three Traction Systems.—In presenting to Keighley Corporation the accounts of the traction department for the year ended March 31 last, Councillor A. Smith, chairman of the Tramways Committee, stated that the running of the motor omnibuses had resulted in a loss of £964. The tramways produced a profit of £450, and the trackless trolley vehicles £284. The total receipts were £714, leaving a deficit of £220. There remained £619 on the motor omnibus account to be paid off, and the whole of this would be dealt with in the current year, leaving assets in hand in the shape of four 'buses, etc. The tramways had carried 3,606,218 passengers, and had run 241,017 miles; the omnibuses had carried 402,158 passengers, covering 64,742 miles; and the railless trolley cars had carried 98,264 passengers, and run 17,114 miles. The extension of the railless system in substitution for omnibuses to Oakworth was expected to be completed by August, and on the Eastburn route about the end of September. The experiment of the halfpenny fares had resulted in the revenue being maintained at nearly the high-water mark. The electrical cost per car mile on the railless cars had been only .64d. per mile, as contrasted with power cost of 3.27d. per mile for the motor omnibuses. This year the last instalment on the cost of the old horse cars would be paid, and that would mean an advantage of £700 a year to the revenue.

CAR MAINTENANCE.

To the Editor of THE TRAMWAY AND RAILWAY WORLD.

SIR,—I notice in "Miscellaneous News and Notes," on page 437 of your issue of June 6, that under the heading of "Car Maintenance at an Average Age of 12 Years," Mr. A. D. Slater, in his annual report, refers to figures given by the Newport tramways manager in connection with the costs of car maintenance of various undertakings. I think it is only fair to state that Mr. Young, of the Newport Tramways, in reply to a letter informed me that the figures he gave were neither based on car mileage, passengers carried, nor standard of maintenance, and, therefore, in my opinion, tend to mislead members of the various tramway committees.—I am, yours faithfully,

J. WILKINSON, Tramways Electrical Engineer.

Kingston-upon-Hull,
June 8, 1914.

[A copy of Mr. Wilkinson's letter was forwarded to Mr. Slater, who has favoured us with the following reply.—ED.]

Re CAR MAINTENANCE AND REPAIRS.

SIR,—I am in receipt of your letter of the 9th inst. kindly enclosing copy of letter you have received from Mr. J. Wilkinson, Tramways Electrical Engineer, Hull.

The remarks in my annual report on the above subject were simply inserted to show that the Burton costs per car for the year were about the average of those shown in the Newport manager's published figures. This return was quoted because the average life of the undertakings shown was about the same as Burton.

However, comparing the published figures of these undertakings for 1911-12, as given in the tables in THE TRAMWAY AND RAILWAY WORLD, I find the average number of miles run per car per annum is also about the same as Burton. It would appear, therefore, that the comparison given in my report is neither unfair nor misleading, either on the basis of the ages of the undertakings or on the average mileage run by the cars, both of which have an important bearing on the question of cost of car maintenance.

As to the standard of maintenance, this doubtless varies to some extent in different undertakings, but it is impossible to take this factor into account in a statement of average cost of car maintenance.—Yours faithfully,

A. B. SLATER, Tramways Manager.

Burton-upon-Trent,
June 10, 1914.

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CONTRACTS AND ORDERS.

Hadfields, Limited, have received a contract for the supply of special track work required in the relaying of tramways in Bolton.

York Council have accepted the tender of the General Cable Manufacturing Company, Limited, for the supply of high and low tension cable, at £6,357, plus £50 for an extra duct.

Sheffield Council have been recommended to accept the tender of Ruston-Proctor and Co., Limited, for electricity generating plant driven by suction gas engines, the General Electric Company to be accepted as sub-contractors.

Colne Council have decided to proceed with the rebuilding of the whole of the tramcars, to fit them with vestbule fronts, and to place top covers on six cars. A new car is to be purchased, and repairs are to be made to the permanent way.

West Ham Council and Car Tenders.—After considering tenders received for the supply of 16 new tramcars the Tramways Committee have directed the manager to "make inquiries in other directions with a view to obtaining more favourable prices."

Hull Council have awarded contracts as appended:—Brush Electrical Engineering Company, Limited, twenty car bodies; M. and G. Truck Engineering Company, Limited, twenty trucks; Siemens Bros. Dynamo Works, Limited, twenty pairs of motors for ordinary series parallel and twenty pairs of controllers.

Warrington Council have placed the following contracts:—Walter Scott, Limited, 100 tons steel tramway rails, £7 10s. per ton; Johnson and Phillips, Limited, transformers; Electric Construction Company, Limited, d.c. motors; British Thomson-Houston Company, Limited, a.c. motors; Johnson and Phillips, Limited, cables.

Trailer Fittings for York Cars.—The Tramways Committee have placed a contract with the Brush Electrical Engineering Company, Limited, for the supply and fixing of coupling bars at each end of eight cars, the provision of attachments for coupling the light and bell signals for communicating between the motor car and trailer and making the necessary alterations to the existing cars, at £27 10s. per car.

PERSONAL.

Mr. F. H. Whysell, of Manchester Corporation electricity department, has been appointed electrical engineer to Greenock Council.

Mr. T. Hall, borough electrical engineer, Burton-on-Trent, has been voted an increase of £25 this year in his salary of £275, and an addition of £50 next year.

Mr. W. J. McCombe, manager, Hull Corporation tramways, has had his salary increased from £500 to £600, by a present instalment of £50 and increments of £25 in the two following years.

Sir George White, chairman of Bristol Tramways and Carriage Company, on June 5 returned to Bristol after a motor tour through France and Italy, upon which he set out immediately after the House of Lords' Committee had given their decision on the Corporation Bill.

Messrs. J. F. C. Snell, J. B. Hamilton, and J. M. McElroy forwarded to Bristol Corporation a reply to criticisms made upon their reports by Councillor J. Littleton at a recent meeting of the Council. Copies of the document were circulated amongst the members by the Town Clerk, and were also published in the newspapers. The ratepayers poll on the question of the purchase of the tramways takes place to-day (Saturday), and the votes will be counted on Monday.

The Late Mr. A. Bruce Anderson.—At an extraordinary meeting of the Council of the British Electrical and Allied Manufacturers' Association, held at 36, Kingsway, on June 8, a resolution was passed deploring the untimely death of the late chairman, Mr. A. Bruce Anderson, who perished at the sinking of the *Empress of Ireland*. The Council also placed on record not only their loss of the chief executive officer of the Association, through whose efforts mainly it has reached its present position, but also the loss of a personal friend. A copy of the resolution was sent to Mrs. Anderson with an expression of the Council's deepest sympathy for her.

FINANCIAL REPORTS AND MEETINGS.

Provincial Tramways Company.—The directors announce an interim dividend of 8d., less tax, upon the £1 ordinary shares.

Melbourne Tramway and Omnibus Company.—A dividend of 6d. and a bonus of 6d. per share have been declared for the quarter ending June 30, and 10s. per share out of realised assets.

Manila Electric Railroad and Lighting Company.—A quarterly dividend of 1¾ per cent. ($1.75 per share) has been declared for the quarter ending June 30, on the common stock.

Lancaster Corporation Tramways.—The past year's trading showed a gross balance of £689. After paying interest and redemption the net deficit is £1,927, compared with a net deficit of £2,254 for the previous year.

New General Traction Company, Limited.—The report for the year ended March 31, submitted to the 18th annual meeting which was held on June 8, stated that the revenue amounted to £21,753, and the profit to £12,484. Adding the sum of £4,407 brought forward, the directors recommended that £10,480 be appropriated to the payment of a 4 per cent. dividend, and the balance of £6,501 carried forward. From the Norwich Electric Tramways Company a dividend of 3 per cent. was received for the year; 1s. 1d. per share from Coventry Electric Tramways Company; and 7 per cent. on preference shares and 3¼ per cent. on ordinary shares from Douglas Southern Electric Tramways, Limited. The income received from the Philadelphia undertaking was £13,922.

Cost of Chars-a-Banc Working at Wolverhampton.—In presenting their report for the past year the Tramways Committee regard the working costs of the motor chars-a-bancs—8.455d. per car mile—as very satisfactory. The slight increase over last year was primarily due to the enhanced cost of fuel. The receipts were £1,705, and a balance of £365 was carried to appropriation account. The expenditure included depreciation of the vehicles and bank interest, but not any proportion of the general management expenses, rents, rates, etc., and it totalled 8.435d. per mile run on a mileage of 48,511. For 1913 the average cost per mile run was 8.107. The traffic receipts were 10.244d. per mile run, as against 9.878d. for the preceding year.

Huddersfield Corporation Tramways.—This undertaking reports a net profit of £8,800 for the past year on an income of £116,320. The sum of £6,662 has been applied for the relief of the rates, and the balance placed to the reserve or renewal account, which now amounts to £30,973. The capital outlay to date is £458,878. The income per car mile was 11.34d., and the total working expenditure 6.92d. per car mile. Alderman Aston, chairman of the committee, said the relief of the rate would be to the extent of 3½d. in the £, thus paying back a further instalment of the money the ratepayers had had to find to subsidise the tramways from 1881 to 1895, and from 1902 to 1905. The amount so paid by the ratepayers amounted to £73,641. That had been reduced every year from and including 1906, and to-day the amount was £25,613.

Working of the Lorain System at Wolverhampton.—The Corporation tramways working for the past year resulted in a gross profit of £24,677. To this sum is added the balance of £365 on the motor chars-a-bancs account, making a total of £24,443. This has been disposed of as follows:—Interest on capital (less interest received), £6,853; income tax on profits, £187; repayment of loans, £5,284; renewals account, £3,715; additions and improvements, £2,848; leaving a balance appropriated to borough rate, 1914-15, of £5,553. The sum of £54,863 now stands to the credit of the reserve and renewals fund. The revenue for the year on the electric traction constitutes a record for the undertaking, and may be accounted for principally through the good trade which has prevailed. The sum of £5,553, equal to 3½d. in the £, has been allocated in relief of the rates. The working cost per car mile shows an increase, being 6.651d. against 6.272d. This is due largely to the assessment of the tramways having been increased from £2,500 to £5,294.

Birmingham District Power and Traction Company.—The directors' report, which appeared in our issue dated June 6, was adopted at the thirtieth general meeting, when Mr. C. S. B. Hilton, the chairman, said that although it had not been possible to recommend a distribution of profits beyond 3½ per cent. on the preferred ordinary shares, the shareholders had no reason to be dissatisfied with the position, or with the outlook. The receipts from the tramways showed an increase of £2,000, of which £400 was contributed by the parcels department, while running expenses had increased by £1,300, of which £760 was accounted for by increases in wages and salaries. Repairs and maintenance had increased by £1,100, mostly caused by additional expenditure on rolling stock. Negotiations were proceeding with Smethwick Corporation for improvements in the track, which, if carried out, would permit of better services on the main line and on the Bearwood Road line, which it was hoped would result in increased traffic. The whole of the electric lighting undertaking had been sold to the Shropshire, Worcestershire, and Staffordshire Electric Power Company.

GLASGOW CORPORATION TRAMWAYS.

The following is an abstract statement of revenue and expenditure for the year ended May 31, 1914, with comparative figures for the previous year:—

REVENUE—YEAR ENDED	31 May, 1914.	31 May, 1913.	
	£	£	£
Traffic Receipts	1,078,691	1,007,653	+ 71,038
Sundry ,,	5,156	3,891	+ 1,265
Total	£1,083,847	£1,011,544	+£72,303
EXPENDITURE.			
Traffic Expenses	332,546	305,400	+ 27,146
General ,,	134,034	122,812	+ 11,222
Maintenance and Repairs	156,214	142,988	+ 13226
Power Expenses	53,483	48,147	+ 5,336
	676,277	619,347	+ 56,930
Balance carried to Net Revenue Account	407,570	392,197	+ 15,373
	£1,083,847	£1,011,544	+ £72,303

NET REVENUE ACCOUNT.	£	£	£
Balance from Revenue Account	407,570	392,197	+ 15,373
Dumbarton Tramways	180	180	—
Interest on Investments	64,809	58,451	+ 6,358
Total	£472,559	£450,828	+ £21,731
APPROPRIATED AS UNDER:—			
Rent of Govan Lines	—	3,345	— 3,345
Rent of Paisley Lines	5,830	5,499	+ 331
Interest on Capital	82,921	81,774	+ 1,147
Sinking Fund	102,607	970,077	+ 5,530
Income Tax	14,057	13,388	+ 669
Parliamentary Expenses	609	985	— 376
Renewal and Depreciation	212,642	215,757	— 3,115
	£418,666	£417,825	+ £841
Surplus to be handed over to Common Good	53,892	33,003	+ 20,889
	£472,558	£450,828	+ £21,730

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Bombay Electric Supply and Tramways Company.—According to the report for the past year the net revenue increased by £16,800. After the transfer of £23,500, as against £22,000, to depreciation account, and £6,600, as against £6,500, to the sinking fund, and the appropriation of £8,000 for redemption of debentures, there was a net profit of £71,200, in comparison with £63,600 for 1912. The dividend on the ordinary shares, which was raised last year from 3 to 5 per cent., is further increased to 6 per cent. £4,300 is to be carried forward.

(Continued from page 494.)

WALTHAMSTOW URBAN DISTRICT COUNCIL.

MOTOR TRACTORS, ETC.

The Council invite tenders for the supply of 4 Motor Tractors and a Motor Sweeper for Municipal Work, either Petrol, Steam, or Electric Driven.

Forms of tender and further information may be obtained on application to Mr. E. Morley, Surveyor to the Council, Town Hall, Walthamstow, on and after Friday, June 12, 1914.

Sealed tenders, endorsed "Tender for Motor Tractors," to be delivered by post only to the undersigned not later than 5 o'clock p.m. on Wednesday, June 24, 1914.

The Council do not bind themselves to accept the lowest or any tender.

C. SYDNEY WATSON,
Clerk to the Council.

Town Hall, Walthamstow,
June 5, 1914.

POSITIONS VACANT.

OLDHAM CORPORATION TRAMWAYS.

DRAUGHTSMAN.

Wanted, for the Car Works, a good all-round Draughtsman. Preference given to one capable of preparing drawings for Permanent Way work.

Applicants must have had experience in Car Construction.

Applications, stating age, salary required, together with copies of three recent testimonials, to be delivered to the undersigned not later than June 23, 1914.

J. W. DUGDALE,
General Manager.

General Manager's Office,
Wallshaw Street, Oldham,
June 10, 1914.

PLATELAYER.

Wanted, in a large Midland town, a Platelayer with good experience of Tramway work. Wages, 9d. per hour.

Apply by letter, with copies of recent testimonials, to Box 2001, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.

FOR SALE.

THE OWNER OF BRITISH PATENT No. 19,462 of 1906, entitled "Improvements in Destination Indicators for Tramway Cars," is desirous of disposing of the patent or entering into working arrangements under licence or otherwise with firms likely to be interested in the same.

A copy of the patent specification, and full particulars can be obtained from and offers made (for transmission to the owner) to MARKS AND CLERK, 57 and 58, Lincoln's Inn Fields, London W.C.

DICK, KERR & CO.,
Limited,
ABCHURCH YARD, CANNON STREET, LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

WEEKLY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended June 6, which included the Whit Monday traffic, give total receipts of £276,949, or £41,075 more than in the corresponding week last year. The total length of track was 2,803 miles, or 24 more than for the corresponding week. Receipts were at the rate of £96 14s. 8d. per track mile, an increase of £13 13s. as compared with the corresponding week of last year.

THE BRITISH ELECTRICAL FEDERATION.

The traffic statement for the week ended June 5, 1914, shows that the receipts from tramways and railways amounted to £53,303 as compared with £42,239 in the corresponding week last year, and from omnibuses £19,091, as compared with £8,407, making a total of £72,394, as compared with £50,646. The tramway and railway route mileage was 429.82 as compared with 428.47 Upon such of the services as were working both last year and this year (Whitsun week) the receipts show an increase of £12,350 upon the week.

RAILWAYS OF THE UNITED KINGDOM.

The summary of the official traffic returns of the fifty principal railways of the United Kingdom for the week ended June 7, which included the Whit Monday traffic, gives a total of £2,257,406, which was earned on 22,161 miles, being at the rate of £101 17s. 3d. per mile of line open. For the corresponding week of 1913 the receipts of the same lines amounted to £2,205,856, with 22,100 miles open, or £102 10s. 6d. per mile. There was thus a decrease of £8,450 in receipts, an increase of 61 in mileage, and a decrease of 13s. 3d. in receipts per mile. Thirty-six of the returns distinguish between the receipts from passenger and goods traffic, and these show an increase of £253,895 (or £11 10s. 7d. per mile) in the passenger receipts and a decrease of £255,365 (or £11 17s. 7d. per mile) in the receipts from goods traffic. The aggregate receipts of the fifty railways since the beginning of the year amounted to £50,303,380, in comparison with £50,792,350 last year, a decrease of £308,970.

COPPER AND ALUMINIUM MARKET.

June 12, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

	Friday, June 12.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	64 17 6	61 15 0	66 2 6
,, (three months)	65 5 0	62 7 6	66 5 0
Electrolytic Copper—bars or ingots ..	67 10 0	65 0 0	70 5 0
Aluminium—bars or ingots	83 0 0	83 0 0	90 0 0

COAL MARKET.

June 12, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

	Friday, June 12.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	s. d.
Best Admiralty Welsh (large)	25 6	25 0	25 6	
Best Seconds	24 0	24 0	24 3	
Ordinary Drys	22 3	21 6	21 6	
Best Washed Nuts	20 6	20 6	21 0	
Best Washed Peas	19 6	19 6	19 6	No Quotations owing to transport workers' strike.
Cardiff, f.o.b.—				
Best Admiralty (large) ..	21 0	20 6	21 0	17 0
Best Seconds	19 6	19 6	19 9	17 0
Ordinary Drys	17 9	17 0	17 0	15 3
Best Washed Nuts	16 0	16 0	16 6	..
Best Washed Peas	15 0	15 0	15 0	..
Newcastle, f.o.b.—				
Best Steams	14 6	15 6	15 0	13 0
Best Seconds	12 6	12 6	13 6	10 9
Smalls	8 9	8 6	8 9	9 0

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregates. Wks.	Aggregates. 1913-4.	Increase or Dec.
Anglo-Argentine	May 27	£58,260	£55,557	21	£1,182,272	+ £6,986
Auckland..... (28 days)	May 8	21,662	22,268	45	226,392	+ 5,419
Ballarat and Bendigo	Mar. 29	2,756	2,315	52	49,909	— 1,242
Brazilian St. Rly. Mlrs.	April	44,765	50,595	39	473,635	+ 71,209
Brazilian Traction.....	June 6	92,492	96,067	23	2,172,596	+ 88,139
Brisbane	May	25,560	29,860	21	140,385	+ 14,395
British Columbia .....$	April	706,633	698,708	43	7,450,590	+ 341,036
Buenos Aires Pt. & City	April	6,659	6,428	17	29,804	+ 3,418
Buenos Aires Lacroze...	May	45,274	44,890	48	490,428	+ 5,927
Calcutta.....Rs.	June 6	48 296	65,832	22	15,40,676	+ 87,282
Cape Town	April	12,175	13,408	17	55,388	+ 3,926
Carthagena & Herreria:	May	2,051	2,202	22	12,391	— 2,782
Cordoba	March	12,668	13,499	52	159,207	+ 13,593
East India	May	1,887	1,885	43	19,124	+ 735
Kalgoorlie.....	April	3,073	2,820	17	9,805	— 1,508
La Plata.....	May	5,130	4,727	21	24,688	— 2,042
Lima.....	April	34,930	34,200	17	140,583	+ 5,910
Lisbon ..... Mlrs.	March	...	160,592	...	...	...
Madras (14 days) Rs.	May 31	28 339	27,766	21	289,984	+ 21,719
Manaos	May	12,877	10,199	4	10,199	— 2,678
Melbourne	April	65 500	65,000	17	262 500	+ 500
Mexico .....$	April	583,558	594,958	17	2,345,807	+ 264,842
Montevideo.....	May	29,831	29,016	31	229,192	— 401
Para	May	25,924	22,465	26	129,509	— 26,036
Port Elizabeth.....	April	4.357	3,758	17	16.633	+ 245
Puebla ..... $	April	60,700	68 100	17	263,500	+ 31,200
Rangoon	May	5 206	5,823	21	27,337	+ 792
Shanghai .....$	June 3	20,440	28,600	22	538,200	+ 92.256
Singapore .....$	June 6	12,288	12,202	22	275,845	+ 9,671
Toronto .....$	April	760,676	830,299	17	3,292,255	+ 263,847
Winnipeg.....$	April	323,563	837,414	17	1,418,875	+ 94,366

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks	1913-4.	Increase or Dec.
Aberdeen Corporation..	May 31	£2,481	£2,797	+ £316	52	£84,273	+ £5,170
Accrington Corp.	June 3	540	688	+ 148	9	5,545	+ 337
Ayr Corporation	,, 6	365	400	+ 35	8	1,200	+ 149
Bath Electric	,, 3	1,366	1,446	+ 80	22	19,115	+ 1,522
Birkenhead Corp.	,, 7	1,292	1,396	+ 104	9½	13,622	+ 169
Birmingham Corp.	,, 6	11,515	14,206	+ 2,661	10	128,179	+ 10,045
Blackburn Corporation	,, 3	1,334	1,715	+ 381	10	14,104	+ 1,467
Blackpool Corporation	,, 4	1,555	3,728	+ 2,173	10	13,950	+ 1,960
Bolton Corporation	,, 7	2,732	3,064	+ 332	10	28,404	+ 1,203
Bournemouth Corp.	,, 10	1,900	2,065	+ 165	10	21,673	+ 1,561
Bradford Corporation..	,, 6	6 123	7,661	+ 1,538	10	62,751	+ 4,521
Brighton Corporation..	,, 7	1,008	1,293	+ 285	9½	10,645	+ 1,043
Bristol	,, 5	8,373	12,305	+ 3,932	22½	181,320	+ 17,272
British Elec. Federatn	,, 5	50,646	72,394	*	...	...	...
Burnley Corporation ..	,, 6	1,693	1,996	+ 303	10	17,411	+ 835
Burton-on-Trent Corp.	,, 7	276	342	+ 66	10	2,962	+ 183
Bury Corporation	,, 7	1,306	1,544	+ 148	9½	18,838	+ 441
Cardiff Corporation	May 23	2,589	2,785	+ 195	7	21.651	+ 1,268
Chatham and District.	June 4	1,022	1,181	+ 159	22	19,499	+ 312
Chesterfield Corp.	,, 4	255	347	+ 92	9	2,750	+ 377
Colne Corporation	,, 6	312	359	+ 47	...	...	...
Cork Electric	,, 4	532	539	+ 7	22	10 589	+ 231
Croydon Corporation ..	May 29	1,843	1,643	— 190	8	15,208	+ 985
Darlington Corporation	June 6	258	290	+ 32	10	2,605	+ 146
Derby Corporation	,, 6	987	1,278	+ 291	9½	10,197	+ 637
Dover Corporation	,, 6	241	304	+ 63	10	2 346	+ 124
Dublin & Lucan	,, 5	180	231	+ 51	22	2,949	Nil
Dublin United	,, 5	6 526	6,979	+ 453	23	124,305	— 3,160
Dundee City	,, 3	1,364	1,399	+ 35	2¾	3,651	+ 41
East Ham Corporation	,, 6	960	1,225	+ 265	9½	10.199	+ 150
Exeter Corporation	,, 5	343	4 8	+ 125	10	3,507	+ 335
Gearless Motor 'Buses.	,, 6	...	501	...	23	10.641	...
Glasgow Corporation ..	,, 6	21,033	22,232	+ 1,199	1	19.967	+ 3,145
Glossop(U.Elec.Supply	,, 6	129	127	— 2	23	2 821	— 67
Halifax Corporation ..	,, 2	2,253	3,131	+ 878	9	20.691	+ 1,417
Hastings & District.....	,, 3	1,025	1,385	+ 360	22	18.842	+ 116
Huddersfield Corp.	,, 6	2,1-6	2,295	+ 1,109	10	28,431	+ 2,457
Hull Corporation	,, 6	3,099	3,325	+ 226	10	30,477	+ 412
Ilford U.D.C.	,, 6	469	674	+ 205	9	4,433	+ 545
Ilkeston Corporation ..	,, 10	134	121	— 13	10	1,352	+ 4
Ipswich Corporation ..	,, 6	467	598	+ 131	10	4,595	+ 366
Isle of Thanet	,, 6	694	979	+ 285	36	14,452	+ 842
Kilmarnock Corp.	,, 6	167	167	Nil	3	578	— 40
Lanarkshire	,, 4	1.754	1,981	+ 227	22	41,838	+ 5,666
Lancashire United	,, 3	1,547	1,866	+ 319	23	35.783	+ 4,118
Leeds City	,, 6	8,663	10,097	+ 1,434	10	83,568	+ 4,137
Leicester Corporation..	,, 6	2,970	3,466	+ 496	23	65,266	+ 3,628
Leith Corporation	,, 6	740	774	+ 34	3	2.446	+ 112
Leyton U.D.C.	,, 4	1,359	1,767	+ 408	9	12 927	+ 772
Liverpool Corporation..	,, 6	13.251	14.249	+ 998	22½	292,726	+ 14,814
Llandudno & Colwyn B.	May 29	263	257	— 6	26	4 997	— 463
London County Council	June 3	42,487	47,346	+ 4 859	9	407.379	+ 21.527
London Gnl. Omnibus..	,, 6	71,898	77,299	+ 5,401	23	1,390,879	+ 29.810
London United	,, 5	7,028	9.692	+ 2,664	23	186 454	+ 4.057
Lowestoft Corporation	,, 6	189	265	+ 76	35	6,526	+ 742
Maidstone Corporation	,, 4	212	272	+ 60	10	2 112	+ 191
Manchester Corp.	,, 6	18.307	18,919	+ 61 2	10	174.429	+ 5.719
Met. Elec. Trys.	,, 5	9.508	11,656	+ 2,148	23	203,243	+ 4,879
Nat. Steam Car Co., Ld.	,, 7	3,284	5,450	+ 2,166	31	127.916	+ 54,326
Nelson Corporation	May 30	206	267	+ 61	8½	1,932	+ 106
N'castle-on-Tyne Corp.	June 6	4,792	5,430	+ 638	10	50,316	+ 5,212
Newport (Mon.) Corp.	,, 6	718	1,042	+ 324	10	8,219	+ 1,000
New St. Helens & Dist..	,, 3	905	1,329	+ 324	49	40.185	+ 3.378
Northampton Corp	,, 5	573	790	+ 217	9½	5 743	+ 257
Nottingham Corp.	,, 4	3,471	4,089	+ 618	9½	32 730	+ 1,189
Oldham Corporation ..	,, 7	2,146	2.288	+ 142	11	24,949	+ 1,830
Portsmouth City	,, 6	2,522	3,002	+ 480	10	22 887	...
Preston Corporation ..	,, 3	879	1,162	+ 283	10	9.088	+ 318
Provincial	,, 6	2,127	2,744	+ 617	35	64,055	+ 3,816
Reading Corporation ..	,, 4	686	894	+ 208	9	6 803	+ 600
Rhondda	,, 4	1,143	1,664	+ 521	22	27,344	+ 1,619
Rochdale Corporation	,, 6	1,651	1,808	+ 157	10	16,261	+ 711
Rotherham Corp.	,, 10	946	1,011	+ 65	10	10,287	+ 540
Salford Corporation ..	,, 8	5,125	6,449	+ 1,324	10	52 273	+ 987
Sheffield Corporation ..	,, 7	7,363	8,597	+ 1,234	10½	91,743	+ 3 740
Southampton Corp.	,, 3	1,385	1,657	+ 272	9	12,466	+ 748
Southend-on-Sea Corp.	,, 3	927	1,424	+ 497	10	9,130	+ 1,799
South Met. Trys.	,, 5	1,075	1,514	+ 439	23	24,506	+ 6,679
South Shields Corp.	,, 6	744	943	+ 199	9½	7,500	+ 1,016
Sunderland Corp.	,, 7	1,488	1,838	+ 350	10	14,870	+ 850
Sunderland District ...	May 27	548	575	+ 27	30	17.166	+ 1,422
Swindon Corporation ...	June 3	180	221	+ 41	9	1,652	+ 204
Torquay	,, 4	546	860	+ 314	22	11,114	+ 319
Trys. (M.E.T.) 'Buses	,, 6	4,857	10,503	+ 5,646	23	198.493	...
TynesideTrys.&Tmrds	,, 3	559	721	+ 162	22	11.703	+ 784
Wallasey Corporation	,, 7	1,251	1,641	+ 390	9½	12 622	+ 1,020
Walsall Corporation ...	,, 6	813	830	+ 17	23	14.277	+ 328
Walthamstow U.D.C....	,, 6	753	1,086	+ 333	10	8,208	+ 1,038
Warrington Corp	,, 4	457	471	+ 14	9	4,119	— 39
West Ham Corporation	,, 4	2,764	3,259	+ 495	9	27,193	+ 1,473
Wigan Corporation	,, 4	1,441	1,780	+ 339	9	14,585	+ 714
Wolverhampton Corp	,, 10	1,036	1,022	— 14	11	11,706	+ 531
Yorkshire (W. Riding)	,, 7	1,416	2.007	+ 591	23	33.547	+ 1,240

* From such of the services as were working both last year and this year the receipts show an Increase of £12,350 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London	June 6	£4,695	£4,960	+ £365	23	£115,764	— £3,069
City and South London	,, 6	2,584	2 605	+ 21	23	62.721	— 4 180
Liverpool Overhead	,, 7	1,745	2,010	+ 275	23	39.217	+ 1,645
London Electric	,, 6	13.420	14,220	+ 800	23	329.115	+ 2,370
Mersey	,, 6	2,194	2.399	+ 205	23	51.930	+ 325
Metropolitan	,, 7	17.384	19,820	+ 2,436	23	415.245	+ 36,059
Metropolitan District	,, 6	13.306	13,638	+ 332	23	302 804	+ 1,243

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TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, June 12.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	69½ — 71½
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	+ ⅛	4⅛ — 5⅛
5	Do. 5½% Cum. 2nd Pref.	...	4⅛ — 4⅝
100	Do. 4% Deb. Stk. Red.	+ ½	98 — 95
100	Do. 4½% Deb. Stk. Red.	...	98½ — 101½
100	Do. 5% Deb. Stk. Red.	...	94½ — 96½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 — 106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅜ — ⅝
1	Do. 5% Cum. Pref	...	⅛ — ¼
100	Do. 4½% 1st. Mort. Deb. Stock, Red.	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	...	84½ — 86½
10	Blackpool and Fleetwood Tramroad Co.	...	14 — 15
	Bombay Elec. Supply and Trams. Co., Ord.	...	14 — 15
10	Do. do. 6% Cum. Pref.	+ ⅛	11 — 11¾
100	Do. do. 4½% Db. Stk Rd	+ ½	93 — 97
$100	Brazilian Traction Light and Power Co. Lim.	— 1	79 — 81
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	+ ⅛	6¾ — 7¼
5	Do. do. 5% Cum. Pref	...	4¾ — 5¼ xd
100	Do. do. 4½% 1st Deb Stock, Red.	+ 1½	100 — 102
10	Bristol Tramways and Carriage Co.	...	6¾ — 7
10	Do. do. 4% Cum. Pref.	...	6⅞ — 7⅛
100	Do. do. 4% Deb. Stock	...	100 — 102
100	Do. do. 4½% Deb. Stock	...	96 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stk.	...	110 — 114
100	Do. Pref. Ord. Stock	...	103 — 107
100	Do. 5% Cum. Perpetual Pref. Stock.	+ 1	104 — 107
100	Do. 4½% 1st Mort. Debs.	...	97 — 100
40	Do. 4½% Vancouver Power Debs.	...	94 — 98
100	Do. 4½% Perpetual Cons. Deb. Stk.	+ ½	94½ — 96½
100	British Elec. Traction Co., Lim., 6% Cum. Pref.	...	88½ — 91½
100	Do. 7% Non-Cum. Pref.	— 2	56 — 59
10	Do. 6% Pref. Ord. Non-Cum.	— 1	13½ — 15½
100	Do. Deferred Ord. Stock	— 1	6 — 8
100	Do. 5% Perpetual Debenture Stock	...	92½ — 94½
100	Do. 4½% Second Debenture Stock, Red	...	77 — 80
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	73 — 78
100	Buenos Ayres Lacroze Trams. Co., Stg. 5% 1st Mrt. Deb.	...	99½ — 101½
5	Calcutta Tramways Co., Limited. Ord.	...	6¼ — 7
5	Do do. 5% Cum. Pref.	...	5 — 5¾
100	Do. do. 4½% 1st Deb. Stock, Red.	+ 1	98 — 101
1	Cape Electric Tramways, Ld.,	...	⅜ — ⅝
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	2¾ — 3¾
100	Do. 5% Debs., Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co. (1904), Lim.	...	5⅜ — 5⅞
100	Do. 4% Debenture Stock Red, 1985	+ 1	98 — 98
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb.	+ 1	91 — 95
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	+ 1¼	92½ — 95½
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	— 6⅞
10	Dublin United Trams. Co. (1896) Lim. Ord.	— ⅛	— 10¾
10	Do. do. 6% Pref.	— ⅛	— 12
100	Do. do. "A" Red.	...	— 80¾
100	Do. do. Deb. Stock "B" Red.	...	— 80
10	Gateshead & Dist Trys. Co., Ord.	...	8¾ — 9
10/-	Hastings & Dist. Electric Trams. Co., Ld., Ord.	...	⅜ — ½
1	Do. do. 6% Cum. Pref.	...	⅝ — ¾
100	Do. do 4½% Deb. Stk. Red.	...	65 — 70
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	93½ — 97½
100	Hong Kong, Tramways Co., 6% Mort. Bds. (Regd.)	...	88½ — 87½
10	Imperial Tramways, Ord.	...	3 — 3½
10	Do. do. 6% Cum. Pref.	...	6¼ — 6¾
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref.	...	3 — 3¼
100	Do. 4% Debenture Stock	...	73 — 78
1	Kalgoorlie Elec. Trams., Ltd.	...	...
100	Do. do. 5% "A" Deb. Stk.	— 2	82 — 87
100	Do. do. 6% "B" do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.	...	⅞ — 1
10	Lanarkshire Tramways Co.	...	9⅞ — 10¾
100	Lancashire United Tramways, 5% Prior Lien Deb.	...	87 — 89
1	Lisbon Electric Trams., Lim., Ord.	...	1⅛ — 1⅜
1	Do. 6% Cum. Pref.	...	⅝ — 1⅛
100	Do. 5% Mort. Debs.	...	95 — 100
1	London and Suburban Trac. Co., Lim., Ord.	...	⅞ — ⅞
100	London General Omnibus Company, Limited, 4½% Deb.	+ 1	100 — 102
100	Do. do. 5% Cum. Inc. Deb. Stk. Red.	...	88 — 91
100	London United Trms. (1901) Ltd., 4% 1st Mt. Deb. Stk. Red	...	56 — 60
100	Madras Electric Trams. (1904) Lim., 6% Cum. Pref.	...	4¾ — 5¾
5	Do. do. 5% Deb. Stk., Red.	...	101 — 103
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	78 — 81
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	...	98¾ — 100¼
$1,000	Do. do. 6% Bds.	...	⅛ — 1⅛
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	87 — 90
100	Metropolitan Elec. Trms. Ltd., 4½% Deb Stock, Red.	...	85¾ — 88½
100	Do. 5% Deb. Stock, Red.	...	73 — 76
100	Mexico Tramways Co., Common Stock	+ 3	79 — 83
500	Do. Gen. Con. 1st Mort. Gld. Bonds	...	77 — 81
100	Do. 6% 50-yr. Mort. Bonds	...	90 — 12
...	Michigan United Railways 5% 1st Mort. Gld. Bonds	...	98 — 100
100	Montreal Street Railway, Sterling 4½% Debs. (1922)	...	97 — 99
100	Do. 4½% Sterling Debs, (1922)	...	...
1	National Steam Car Co. Ltd.	...	2¾ — 3¼
10	Oldham—Ashton and Hyde Elec. Ord.	...	6 — 6½
10	Do. do. 5% Cum. Pref.	...	5⅜ — 6½
5	Para Elec. Rlys. and Ltg. Co., Ord.	+ ⅛	4 — 4½
5	Do. do. 6% Cum. Pref.	...	4 — 4½
1	Perth (W.A.) Elec. Trams.. Ld., Ord.	...	— —
1	Potteries Electric Traction Co., Ltd., Ord.	...	⅝ — ¾
1	Do. 5% Cum. Pref.	...	¾ — ⅞
100	Do. 4½% Debenture Stock, Red.	...	81¾ — 84¾
1	Provincial Tramways, Lim., Ord.	...	⅛ — ⅜
10	Do. 5% 1st Deb. Stock	...	98 — 103
...	Puebla Tramway, Light & Power Co., Prior Lien 5%	...	78 — 78
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.	...	5 — 5½
100	Do. do. 4½% 1st Mt. Db. Stk	...	95 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	87 — 89
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30 yr, 5% Gd. Bds.	+ 1½	99 — 101
100	Do. do. 5% 50-yr. Mort. Gold Bonds	+ ½	89 — 91
$500	Sao Paulo Tr. Light & Power, Co. 5% 1st Mort. Debs. 1929	+ 1	95 — 99
100	Do. do. 5% Perp. Cons. Debs.	+ 1	97 — 100
10	Shanghai Elec. Construction Co.	...	12½ — 13½
100	Singapore Elec. Tramways Lim., 5% Debs. Red	...	88 — 92
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref.	...	...
100	Do. do. 4% Deb. Stk.	...	66 — 70
...	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	95 — 97
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	97 — 99
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	— 1	80 — 82
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	90 — 92
5	United Elec. Tramways of Monte Video, Ord.	...	4¾ — 5¼
5	Do. do. 6% Cum. Pref.	...	4¾ — 5¾
100	Do. do. 5% 1st Deb. Stk. Red.	— ½	92 — 95
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	93½ — 96½
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	⅛ — ⅜
5	Do. do. 6% Cum. Pref.	...	4¼ — 4¾
100	Do. do. 4½% 1st Deb. Stock. Red.	+ 1	86 — 88

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than 3 p.m. on Friday.

Advertisements for the next issue of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, LONDON."
Telephone: No. 2948 GERRARD.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF ROTHERHAM.

The Electric Light and Tramways Committee of the Rotherham Corporation invite tenders for their requirements during the ensuing twelve months of the following, viz.:—

1. Tramway Stores and Materials.—Printing, Stationery, Oils, Grease, Tools, Brake-blocks, Paint and Varnishes, Lamps, Sand, etc., etc.
2. Smudge and Pea Nuts.
3. Single Vulcanised Bitumen-covered Cable, High Tension Cable, Rubber Insulated Cable and Trolley Wire, of various sizes.
4. Ampere Hour Meters, of sizes and maximum currents of 2, 5, 10, 25, and 50 amperes. Supply pressure 230 and 450 volts.
5. Motormen's Oilskin Coats and Conductors' Mackintosh Coats.

Forms of specification, tender, and particulars can be obtained on application to the Engineer and Manager, Electricity Works, Rotherham.

The persons or firms whose tenders are respectively accepted will be required to enter into contracts which will contain the usual Fair Contracts Clause.

Tenders properly endorsed to be sent to me not later than July 8 next.

By Order, CHAS. L. DES FORGES,
Town Clerk.

Town Hall, Rotherham,
June 9, 1914

COUNTY BOROUGH OF ROCHDALE.

ELECTRICAL ENGINEER'S DEPARTMENT.

CONTRACT A. 64.—WET AIR FILTER (1914).

The Electricity Committee of the above Corporation invite tenders for the supply, delivery, and erection at their Electric Power Station, Dane Street, Rochdale, of the above plant.

Specifications and form of tender may be obtained from Mr. C. C. Atchison, M.I.E.E., Engineer and Manager, Dane Street, Rochdale, on receipt of a deposit of one guinea, which will be returned on the receipt of the specification, etc., intact, together with a *bonâ-fide* tender. Additional copies of the specification may be obtained on payment of a further fee of half a guinea per copy, which will not be refunded.

Sealed tenders, on the prescribed form, endorsed as above, must be delivered to me not later than noon Wednesday, July 1, 1914.

The Corporation will not be bound to accept the lowest or any tender.

W. H. HICKSON,
Town Clerk.

Town Hall, Rochdale,

BOROUGH OF DONCASTER.

TRAMWAYS DEPARTMENT.

The Doncaster Corporation are prepared to receive tenders for the supply and erection of Overhead Equipment for approximately 5 miles of Tramway track.

Copies of the specifications and conditions may be obtained on application to the Borough Electrical Engineer and Tramways Manager, Grey Friars Road, Doncaster.

Tenders, endorsed "Overhead Equipment," to be delivered not later than June 22, 1914.

E. S. RAYNER,
Borough Electrical Engineer and Tramways Manager.

COUNTY OF LONDON.

The London County Council invites tenders for (1) the supply, etc., of (*a*) 5 Rotary Converters each of 1,500 kw., and (*b*) 15 Main Static Transformers for 1,500 kw. rotary converters, together with 2 Starting Static Transformers, and (2) the dismantling, removal and re-erection of existing motor generators.

Tenders are also invited for the supply, etc., of a 20-ton Overhead Travelling Hand Crane for use at the Holloway Sub-station.

The specifications, forms of tender, etc., may be obtained on application to the Clerk of the Council, at the County Hall, Spring Gardens, S.W., after payment to the cashier of the Council of the sum of £2 in each case. These amounts will be returnable only if the tenderer shall have sent in a *bonâ-fide* tender, and shall not have withdrawn the same. Particulars may be obtained at the County Hall before the payment of the fee.

The person whose tender is accepted will be bound by the contract to pay wages at rates not less, and to observe hours of labour not greater, than the rates and hours set out in the Council's list. Particulars of the Council's Standing Orders as to its conditions of tender and contract are given in every issue of the *London County Council Gazette*. No tender received after 11 a.m. on Tuesday, July 14, 1914, will be considered. The Council does not bind itself to accept any tender.

LAURENCE GOMME,
Clerk of the London County Council.

County Hall, Spring Gardens, S.W.,
June 15, 1914.

COUNTY BOROUGH OF WALSALL.

TENDERS FOR BOILERS, PUMPS, PIPEWORK, ETC.

The Walsall Corporation invite tenders for the supply, delivery, and erection of:—

Four Water Tube Boilers, with
Superheaters, Economisers, and Stokers.
Feed Pumps and Feed Water Heater.
Water softener, Tanks, etc.
Steam and Exhaust Pipes.
Water Pipes, etc.

Copies of the specification, formal conditions, etc., may be obtained upon application to the Consulting Engineer, Mr. E. M. Lacey, M.Inst.C.E., 12, Victoria Street, Westminster, London, S.W., on payment of five guineas, which will be returned on receipt of a *bonâ-fide* tender.

Extra copies of the specification may be obtained on payment of one guinea each, which will not be returned.

Tenders, sealed and endorsed on the outside "Tender for Electricity Works, Contract No. 3," to be addressed to the Town Clerk, Walsall, and delivered not later than 10 a.m. on Tuesday, July 14 next.

The Corporation do not bind themselves to accept the lowest or any tender.

By Order, HERBERT LEE,
Town Clerk.

Council House, Walsall,
June, 1914.

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COUNTY BOROUGH OF WALSALL.

TENDERS FOR TURBINES, CONDENSING PLANT, ETC.

The Walsall Corporation invite tenders for the supply, delivery, and erection of :—

Two 3,000 kw. Turbo-Alternators, with Surface Condensers.
Motor Generator.

Copies of the specification, formal conditions, etc., may be obtained upon application to the Consulting Engineer, Mr. E. M. Lacey, M.Inst.C.E., 12, Victoria Street, Westminster, London, S.W., on payment of five guineas, which will be returned on receipt of a *bonâ-fide* tender. Extra copies of the specification may be obtained on payment of one guinea each, which will not be returned.

Tenders, sealed and endorsed on the outside "Tender for Electricity Works, Contract No. 2," to be addressed to the Town Clerk, Walsall, and delivered not later than 10 a.m. on Tuesday, July 14 next. The Corporation do not bind themselves to accept the lowest or any tender.

By Order, HERBERT LEE,
Council House, Walsall, Town Clerk.
June, 1914.

POSITIONS VACANT.

OLDHAM CORPORATION TRAMWAYS.

DRAUGHTSMAN.

Wanted, for the Car Works, a good all-round Draughtsman. Preference given to one capable of preparing drawings for Permanent Way work.

Applicants must have had experience in Car Construction.

Applications, stating age, salary required, together with copies of three recent testimonials, to be delivered to the undersigned not later than June 23, 1914.

J. W. DUGDALE,
General Manager's Office, General Manager.
Wallshaw Street, Oldham,
June 10, 1914.

FOREMAN PLATELAYERS.

Wanted, Two Working Foreman Platelayers, permanent job. Apply, giving particulars of experience, and wages required, Engineer and Manager, Rhondda Tramways Company, Limited, Rheola Road, Porth (Glam.).

BUSINESS FOR SALE.

GOOD OPENING FOR ENERGETIC MAN.—The business of the late Mr. George Conaty, 109, Colmore Row, Birmingham, is for Sale. It has been established six years, and has at present a fair amount of work in hand of a mechanical nature. Apply, Mrs. Conaty, Mayfield House, King's Heath, Birmingham.

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Complete with Title-Page and Index,
VOL. XXXIII., JANUARY—JUNE. 1913
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THE
Tramway AND Railway World

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SATURDAY, JUNE 20, 1914.

THE "OCEAN"

ACCIDENT AND GUARANTEE CORPORATION, LTD.,

IS THE

PREMIER INSURER OF TRAMWAYS

HEAD OFFICE:

MOORGATE STREET, LONDON, E.C.

BRISTOL AND MUNICIPALISATION.

The main conditions prevalent in other important centres on the occasion of battles for the acquisition of tramway undertakings by local authorities were toned down in the circumstances that attended the movement for the purchase of the lines of the Bristol Tramways and Carriage Company. It is indeed surprising to find, in view of all the circumstances, that the ratepayers' poll yielded so large a majority as 3,163 in favour of the Council's policy. That margin was not so large as were the majorities elsewhere in the days when electrification had not long been introduced, and when there was nothing to show that any other means of locomotion would arise as a competitor to tramways. Bristol is the last great concentrated area in England to be polled on the question. Its tramway company have shown their customary enterprise not only in taking up the running of road motor vehicles for public traffic, pleasure purposes and commercial use, but in the manufacture of such vehicles for themselves and for other users. It was mainly the omnibus factor, combined with the excellent manner in which the Bristol company have served the citizens as tramway undertakers, that led to so stiffly-contested a poll. The poll was stiffly contested in the sense that the majority was not large, but, on the other hand, a very large proportion of the ratepayers, with the indifference habitual to them, did not go to the trouble to vote at all. A tribute to the company is to be found in the fact that while the experts consulted by the Corporation affirmed that there is scope for a reduction in fares, local speakers have referred to the rate-relieving undertakings mentioned by the consultants as charging a higher average fare per passenger than is levied in the western city. If such be the case, it is a tribute to the politic management of the municipalities. Future steps to be taken at Bristol constitute matters of general interest. As it is unlikely that the terms of purchase will be arranged outside of an arbitration court, there will be a conflict of opinion over the total of £600,000 suggested as the price by the Corporation's experts. Many absurdly overdrawn pictures of what the company are likely to do in the way of omnibus competition were drawn in the course of the conflict, but the directors are not likely to waste their resources in that manner, even if the opportunity offered. Doubtless the Corporation will gladly avail themselves of the company's motor facilities where there are no tramways, though it will not be long before the former follow the example now generally set by municipalities by applying for powers to run omnibuses, leaving the company to cater for pleasure traffic in addition to their activities elsewhere.

THE MUNICIPAL ELECTRICAL CONVENTION.

The annual meeting of the I.M.E.A., which has practically terminated to-day, has given interesting evidence of the increasing vitality of the Association. Throughout the proceedings it was clear that electrical engineers are by no means satisfied with the position of the industry in this country. That is so much to the good, as is also the growing feeling that the industry must act as a whole if progress is to be made. As Mr. Chattock pointed out in his stimulating presidential address, if this country is to maintain its position in the face of increasing competition from abroad, it is necessary that manufacturers and the public should be given the best and cheapest facilities both for manufacturing work and transportation. The electrical business has grown up in this country through much legislative restriction imposed by those who had little idea of its future development. This has hampered the development of power supply and traction systems, and in some towns has even made the latter subservient to the interests of the electric light stations. Now engineers are coming to regard electric light, as Mr. Fedden remarked in a discussion of Mr. Vignoles's paper, rather as a by-product; and he, with others, is looking forward to the day when the supply of energy for manufacturing and traction shall far outstrip anything that has been anticipated. The essential thing is, of course, that power should be procured cheaply. In comparison with this the prejudices of local authorities and their desire to maintain the absolute independence of their supply stations should not weigh for a moment. Even comparatively large traction stations may before many years become out of date; and traction engineers would certainly not wish to oppose any suggestions which may eventually provide them with cheaper energy. The discontent which is being shown at the inactivity of the Institution of Electrical Engineers in dealing with the commercial features of the industry is another satisfactory sign of the present time, and so likewise is the increasing interest which is taken by electrical engineers in the commercial work of their undertakings. After all, engineering is but a means to an end; and while it is essential that the best engineering skill obtainable should be utilised in commercial undertakings, that side of the work is only subsidiary to the commercial management. What we want in this country is a little more of that desire to get things done which seems so thoroughly to permeate American and German undertakings; and if some means could be found more rapidly to transmute into action many of the excellent suggestions which were made at Birming-

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ham during the past week, we should have more hope of the successful result of the competition which our manufacturers are bound to experience in a much greater measure than they have felt as yet. It is unquestionably an immense advantage that we have two such important organisations as the Municipal Electrical Association and the Municipal Tramways Association actively advocating broader views and a more liberal policy than in the past have prevailed in municipal enterprise.

TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION.

Special dining cars will be attached to the train leaving King's Cross at 2.15 p.m. on Wednesday, July 15, for the use of members attending the Congress. The Secretary will attend at "The Secretary's Office," Central Station Hotel, at 9 p.m., on Wednesday, July 15, when the Congress badges will be distributed.

The following is the official programme:—

Thursday, July 16.

10 a.m.—Reception by the Right Hon. the Lord Mayor of Newcastle-upon-Tyne, Connaught Hall, Blackett Street, Newcastle.

10.30 a.m.—Papers and Discussions.

"Some Features of Newcastle Corporation Tramways," by Councillor R. Mayne, J.P., Vice-Chairman, Newcastle Corporation Tramways Committee.

"Tramway Experiences in Brazil," by Mr. H. M. Sayers, M.I.E.E.

"Standard Tram Rails: A Comparison of English and Foreign Sections," by Fred Bland, M.I.Mech.E. (Member of the Council).

3 p.m.—Cars leave Central Station for Jesmond Dene, where the Lord Mayor and members of the Corporation will entertain the delegates at a garden party.

7.30 p.m.—Banquet at Tilley's Rooms, Market Street, given by the Lord Mayor and members of the Corporation.

Friday, July 17.

10.30 a.m.—Connaught Hall: Papers and Discussions.

"Rail-Joints: Their Construction and Maintenance," by Mr. R. Humphries, Tramways Engineer, Birmingham and Midland Tramways Joint Committee.

"Town Planning," by Mr. J. A. Brodie, City Engineer, Liverpool Corporation.

2.15 p.m.—Newcastle Quay: Departure by special steamer, provided by the Corporation of Newcastle: Trip on River Tyne.

4 p.m.—Arrival at Tynemouth: Tea at Tynemouth, given by the Chairman and Directors of the Tyneside Tramways and Tramroads Company.

5.30 p.m.—Return to Newcastle by special steamer. (Members wishing to return by land can do so by tram or by electric train.)

9 p.m.—Supper and dance at Tilley's Rooms, Market Street, given by the Chairman and Directors of the Northern General Transport Company and the Gateshead, Tynemouth, and Jarrow Tramway Companies.

On Saturday, July 18, special breakfast cars will be attached to the train leaving Newcastle at 8 a.m. for the use of members.

PRIVATE BILL LEGISLATION.

GLASGOW.—Lord Ribblesdale's Committee of the House of Lords on June 11 concluded the consideration of the Glasgow Corporation Tramways Bill so far as it concerns the construction of a new tramway down Hamilton Drive, past Queen Margaret College, to Byres Road. The committee found the preamble of this tramway scheme proved. The University authorities are to have three months to treat with the Corporation as to whether they will allow the College to remain on its present site, or erect another building elsewhere.

NEWCASTLE-ON-TYNE.—The Corporation Bill to authorise tramway extensions in Longbenton and Westslade was further considered by a House of Commons Committee on Wednesday when Mr. Ernest Hatton, the engineer and manager of the tramways, stated that one of the proposed lines would be of great assistance to the existing undertaking at times of race meetings. He estimated that this line would produce a profit of £1,084. Taking this along with the estimated profit for the Longbenton line he arrived at a total of £3,072. As to the proposal to charge special fares, the Corporation were asking no more than the Tyneside Tramways Company already had. If they had no power to charge special fares they were going to lose money. The total receipts for the race days were £3,503, of which, under the agreement with the Tyneside Company, the latter received 7/17, or £1,443, and the Corporation £2,060. The latter had to provide all the cars, the men, and the power. If the fare were reduced to 4d., the Corporation's share would be £962, against £1,186 costs. If they obtained the power asked for, no hardship would be inflicted on Gosforth residents who did not wish to go to the races. They also sought power to run special cars for football matches and so on, on which passengers travelling for only a short distance would have to pay the full fare. In addition, they sought power to run trailer cars as a matter of economy. This was subject to the approval of the Board of Trade. The chairman, Sir John Barran, asked whether the promoters had considered whether it might be more advantageous to run an omnibus service to Benton Lane rather than a tramway service. Mr. Hatton replied: We have considered that, and were it not for the heavy traffic to the races, for some years that might improve the service, but 'buses are utterly inadequate to deal with the race traffic. The Chairman: You have considered, of course, the heavy charges of putting down your tram lines? We have. If we had to run 'buses, we should require 40, which at £800 each would mean £32,000. No doubt we shall have to pay something like that sum for the tram lines, but all the cars we now possess and those we shall acquire in the development of our business will be common to the whole of our service. On Thursday the committee found the preamble of the Bill proved, subject to certain conditions regarding minor matters.

JUBILEE OF THE BELFAST TRAMWAY MANAGER.

THE NOTABLE RECORD OF MR. ANDREW NANCE.

Mr. Andrew Nance, the general manager of the Belfast tramways undertaking, celebrates during the present month the jubilee of his association with tramway work. His introduction to it was made as far back as June, 1864, when he became a pupil of Mr. R. Jacomb-Hood, of Little George Street, Westminster, who was the engineer for the Landport and Southsea tramways for which Parliamentary sanction was obtained in 1863, and which were constructed in the following year. Mr. Nance's duties included assisting in the preparation of the drawings, and when the construction stage was reached of making measurements. Those were the pioneer days of tramways, and the lines in question were amongst the first, if not actually the first, to be laid in the streets of a British town. The rails used on that occasion were peculiar. They were secured to longitudinal sleepers by countersunk screws. At the time they were considered superior to the American step rail. In 1870, however, they were replaced by the trough, which had a check rail. One of the first companies authorised to adopt that system was the Portsmouth Street Tramway Company which took over the Landport and Southsea concern and constructed several other lines. The Act relating to this was passed in 1870, and the tramways were at once constructed. Mr. Nance was one of the first directors of the Portsmouth Company, his name appearing in the Act of Parliament. In 1887 Mr. Nance took over the management of the Belfast Street tramways, which then employed horse traction, and the company made great progress under his guidance, the annual receipts rising from £14,500 to £272,000, when good dividends were paid with unbroken regularity. When the transfer to municipal ownership came about ten years ago—the concern being purchased for almost £400,000—Mr. Nance still retained the managership. The system was electrified, and the undertaking thus brought into modern condition has continued to flourish. Mr. Nance is a warm advocate of the universal penny fare for Belfast, and when last his scheme in that connection was debated by the City Council it was rejected by a solitary vote. On the interesting occasion of his jubilee of tramway service the Belfast general manager has the cordial congratulations of his staff and of the citizens, whose good wishes will be joined in by those associated with tramway undertakings in other parts. There are few, if any, tramway officers who can point to such a long and successful career.

TRAMWAY MANAGERS' CONFERENCE.

The conference of the managers' section of the Municipal Tramways Association met at Plymouth on Thursday, the 11th inst. Among those present were:—

Messrs. L. E. Harvey (Ilford), W. Tuke Robson (South Shields), W. Murray (Walthamstow), W. J. McCombe (Hull), R. Wilkinson (Huddersfield), J. F. Simpson (Preston), T. J. Kendrew (Southport), C. L. Stewart (Rawtenstall), G. F. Craven (Reading), J. Moffet (West Ham), G. W. Holford (Salford), W. Clough (Bury), G. Webster (Rochdale), F. J. S. Hosken (Darwen), H. Mozley (Burnley), J. M. McElroy (Manchester), F. Gottschalk (Northampton), J. E. Pearse (Northampton), J. Barnard (Bolton), T. G. Richardson (Colne), W. A. Luntley (Wolverhamptn), R. L. Acland (Chesterfield), H. Pilling (Accrington), H. Stokes (Bexley Heath), J. Miles (Bolton), E. Holt (Ashton-under-Lyne), F. Schofield (Stalybridge), H. C. Bartlett (Exeter), C. R. Everson (Plymouth), E. S. Rayner (Doncaster), A. B. Slater (Burton-on-Trent), and J. W. Falkingham (Bradford).

The members were welcomed cordially by the Mayor, Mr. T. Baker, in the Council Chamber. The president, Alderman H. Linsley, Salford, replied, and the business of the meeting began with the discussion on two papers:—"Description of the Plymouth Corporation Tramway System," by Mr. C. R. Everson (manager of the Plymouth tramways); and "The cost of the production of electrical energy for traction purposes," by Mr. J. F. Simpson (Preston). Subsequently a luncheon was given by the Mayor at the Royal Hotel. After lunch Devonport Dockyard was inspected under official guidance, and the company then adjourned to a tea at the Royal Hotel, given by the Tramways Committee. At the session next day, under the presidency of Alderman H. Linsley, of Salford, two papers were discussed:—"Workmen's Return Tickets," by Mr. E. S. Rayner, Doncaster, and "Self-contained Electrically-equipped Vehicles," by Mr. L. E. Harvey, Ilford. A hearty vote of thanks was accorded the Mayor (Mr. T. Baker) and Corporation; and the chairman (Mr. S. H. Phillips) and committee

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of Plymouth Corporation tramways. At the lunch, which followed, given to the members by the Deputy-Mayor (Mr. S. H. Phillips, chairman of the Tramways Committee), the Mayor and town clerk (Mr. J. H. Ellis) were present also, besides those previously named:—Messrs. J. B. Hamilton (Leeds), A. R. Fearnley (Sheffield), J. Dalrymple (Glasgow), C. W. Mallins (Liverpool), and C. J. Spencer (Bradford), hon. secretary of the Association. The convention was closed with a trip to Colstock and the Weir Head in beautiful weather, and the members were, naturally, delighted with their reception.

THE I.M.E.A. CONVENTION.

The Incorporated Municipal Electrical Association held its fourteenth annual conference at Birmingham this week, when the proceedings were carried out very successfully and agreeably, even the weather contributing its utmost to grace the occasion. Over 400 members and guests were present, and the president, Mr. R. A. Chattock, city electrical engineer of Birmingham, was most cordially supported by the Corporation and the Birmingham Entertainments Committee in his efforts to render the convention both pleasant and useful. As a prelude the committee entertained the members at a smoking concert on Monday evening. On Tuesday morning the president gave his address, which was full of practical points, suggesting progress in many directions. It is seldom indeed that a presidential address is so suggestive or goes so far out of the beaten track.

In the course of his address Mr. Chattock expressed regret that the contentious clauses in the model general conditions had not yet been agreed between this Association and the British Electrical and Allied Manufacturers' Association, and that the Electric Lighting Bill had not been brought before Parliament. Adverting to the progress which had been made in developing the use of the electric battery vehicle by the Electric Vehicle Committee, he said that it was impossible for the manufacturers themselves to give extended trials in more than a few towns. It was only by bringing these vehicles before the public that interest would be aroused in them, and for this purpose he considered that supply undertakings should be prepared, themselves to bear some of the cost. Demonstration vehicles could quite well be used in many municipal departments, and money spent in pioneering work of that kind would, he was convinced, amply repay the supply undertaking. It also gave confidence to the public when they saw the vehicles in service, and it enabled first-hand figures as to cost of operation to be given. He put forward the suggestion to the municipalities that if they as well as the manufacturers of the vehicles contributed to the preliminary work of the committee, such contributions would be repaid to them many times over when the electric vehicle came into general use. Dealing with the centralisation of electric supply undertakings, the President observed that Parliament had recognised the principle by agreeing to the formation of the various power supply companies which were operating in several counties. Our manufactories could only hold their own in the markets of the world by producing as cheaply as possible, and one most important consideration towards this end was the provision of cheap power and cheap transit for both goods and workmen. America and Germany were establishing centrally controlled systems of supply, which could not fail to have a far-reaching effect upon their commercial welfare. It would be as necessary to face expenditure in pioneering of this scheme as it was in the early days of electric lighting, with the difference that the returns to be expected would come very much sooner. For pushing the business the present engineers would be invaluable. Business control was every bit as valuable as engineering control; and engineers had to be business men as well. He suggested that the large municipalities should meet and discuss the matter.

The first paper, which may be described as a monograph, was entitled "The Commercial Development of Electricity Supply in Moderate-sized Towns." The author, Mr. W. A. Vignoles, chief electrical engineer of Grimsby Corporation, covered an enormous field, but he gave an excellent and suggestive summary in opening the discussion. The paper should have the special attention of every engineer who is inclined to belittle the commercial side of his work. Every electric supply undertaking, like every tramway, is first of all a commercial enterprise; and we are glad to see that municipal engineers are coming at length to appreciate the fact that their principal energies should be devoted to extension of their businesses. Good engineering is essential, but there are more capable engineers than there are men of good business enterprise.

The discussion though naturally in view of the extent of the subject, somewhat discursive, served to bring out very clearly the agreement of the members with M. Vignoles' ideas on this point. The remark of Mr. Feddon, of Sheffield, that he had come to regard electric lighting as a sort of by-product shows how rapidly the municipal engineers are now assimilating ideas which in the early days of power supply were the possession of comparatively few.

On adjournment the members returned to the Grand Hotel, where they were the guests at luncheon of the Birmingham Entertainments Committee. Subsequently visits were paid to the General Electric Works at Witton. After a tour through the shops members gathered in the recreation ground in front of the works to inspect a number of electrical vehicles which were paraded there. Last year a similar parade was arranged at Kingston, but this year's demonstration was a notable advance. In a later issue we shall give further particulars, and here merely enumerate the list of vehicles and makers:—Edison Accumulators, Ltd., 2, Duke Street, London, S.W., showed four, including a passenger roadster, light delivery van, a merchandise truck and a heavy type of M.A.B. ambulance; the Torpedo Electric Motor Company, 122, Hampstead Road, N.W., were represented by a light delivery van and a passenger roadster; the General Vehicle Company, of Long Island, New York, and 83, Cannon Street, E.C., showed a light delivery van and a heavy goods delivery wagon; while Messrs. Mossay and Company, of 45, Horseferry Road, S.W., showed an interesting tractor and a heavy goods delivery van. The parade was completed by Messrs. W. A. Stevens, Limited, of Victoria Works, Maidstone, who showed two heavy goods delivery wagons of a thoroughly workmanlike type.

Later a visit was paid to the works of Messrs. Bellis and Morcom, where tea was served.

In the evening Mr. Chattock presided at the annual dinner, when he was supported by the Lord Mayor, the Deputy Lord Mayor, and over 400 members and guests.

Wednesday morning the members travelled by special train to Coventry, where they were welcomed in the ancient town hall by the Mayor. Mr. S. E. Feddon then introduced his important paper on "The Design and Operation of Modern Boiler-house Plant." Adverting to the facilities for disposal of ashes, he said that that point was becoming a serious source of expense and concern in large cities because of the difficulty of obtaining tips within a reasonable distance of the station. The increased expense could quite appreciably increase the cost per unit, so that at a certain point it was necessary to take into consideration whether it was not worth while to buy a high price coal with a minimum percentage of ash. The author had lately gone to considerable expense in dealing with ashes by the installation of a ropeway over a steel bridge erected across a main line of railway, so that the ashes could be tipped in an adjacent valley. The cost was 1s. 3d per ton, as against 1s. 11d. by cartage and 2s. 9½d. by railway. In the matter of facilities for getting in coal it was advantageous to choose a site having a high-level siding, so that trucks came in straight off the railway over the top of the bunkers, thereby doing away with the expense of installing and running coal conveyors. Although the problem looked rather a formidable one the author had arranged his Neepsend power-house on the foregoing plan, and an expensive looking site had turned out to be a cheap one as regards cost. The capital cost per k.w. for the first section of the station was below £10, including the cost of land and sidings. There was a three weeks' supply of coal opposite each boiler on the siding level, and each boiler had a shoot holding about 100 tons of coal, which fed by gravity into the mechanical stoker hopper. An electrical traverser was used for the transference of the trucks over the five railway lines above the tops of the bunkers. The shoots were fitted with measuring chambers and indicating gear, and the author disproved the contention that measuring chambers were most inaccurate. While not supporting the argument that warming water by live steam saved coal, he conceded that any loss incurred by that practice was repaid in the saving of repairs to the economiser and boiler tubes. A section plant was about to be put in for all new boilers, and eventually for the old ones, by which it was expected that considerable labour would be saved and much dirt, dust and soot done away with. There was an economic limit to the high rate of combustion, both as regards efficiency and maintenance, which all engineers aimed at getting, and it was comforting to feel that boilers could be pushed to 40 or 50 per cent. above their normal working load in case of emergency. In the event of a very high rate of combustion becoming general and proving itself satisfactory there would have to be a re-designing of the boiler combination. On the question of stokers he considered that the safest arrangement for a large boiler house would be to install a certain proportion of the old reliable chain grate, and the remaining portion of the newer type, which had yet to prove its superiority over a long period. The paper gave valuable information regarding the storage of coal, a question which needed consideration in order to cope with emergencies caused through strikes.

An interesting discussion followed, and the members were subsequently entertained at luncheon in the Drill Hall by the Mayor of Coventry. The afternoon was spent in visits to works in the vicinity. A large party proceeded to Rugby, where the works of the British Thomson-Houston Company and Messrs. Willans and Robinson were open for inspection. Other members were shown the works of the Daimler Company, the Triumph Cycle Works, Coventry Chain Company, and the B.T.H. Meter Works at Coventry. In the evening the Lord Mayor of Birmingham (Lieutenant-Colonel E. Martineau) and the Lady Mayoress held a reception at the Council House, when about 600 members of the Association and guests were present. The arrangements were of an elaborate nature, the reception being followed by a dance, while musical and other entertainments were given in the council chamber.

On Thursday the Association visited Stratford-on-Avon, where they were officially welcomed by the Mayor, Councillor F. Winter, and Mr. J. H. Bowden, chief electrical engineer of Poplar, read a paper on "The Standardisation of Tariffs." On returning to Birmingham the members attended an open air fête and concert in the Botanical Gardens, arranged by the Birmingham Entertainments Committee. On Friday the annual business meeting was held, and to-day the members will visit Worcester. The arrangements for the week, including a special programme for the ladies and many other appointments not mentioned above, were admirably carried out.

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THE WORKS OF THE GENERAL ELECTRIC COMPANY.

As a preliminary to the visit by the members of the Incorporated Municipal Electrical Association to the works of the General Electric Company at Witton, Birmingham, on Tuesday last, a party of Press representatives were invited to inspect these extensive works on Monday. A good many hours were devoted to going over the great workshops at Witton, and also to a briefer survey of the company's Ileene works on the other side of Birmingham. The Witton works are the manufacturing headquarters of the General Electric Company, and here is produced electric plant in the largest sizes, including turbo-generators, slow speed alternators, continuous current generators and motors, motor generators, rotary converters and other similar machines. High and low tension switchboards, fans, arc lamps, electric conduit, primary batteries and arc lamp carbons are among the other class of apparatus which are here produced. The Ileene works, on the other hand, are devoted to the manufacture of electric fittings, small accessories, lamp holders and heating and cooking apparatus. The great scale of the company's operations can be gathered from the fact that in their Birmingham, Manchester, London, and Southampton works they now have about 10,000 employees.

One of the most interesting features of the works is the department in which arc lamp carbons are made. This is the only factory of the kind in the United Kingdom, and the machinery for and the processes of crushing the carbon, reducing it to paste, squirting it into rolls, baking it in ovens, and cutting it up into suitable lengths were explained to the visitors.

The visitors were entertained at lunch by the directors of the company in the Grand Hotel, Birmingham, when Mr. Hugo Hirst the chairman of the company, in welcoming the party, made some reference to the coming visit of the Municipal Electrical Association, and while admitting that municipalities had done good work in the matter of electrical supply, he pointed out that the industry had been very much hampered in this country owing to electrical supply having been limited by municipal boundaries.

MISCELLANEOUS NEWS AND NOTES.

Electric Van for Poplar.—The Borough Council have decided to purchase a light electric van or wagon for the use of the electricity undertaking, at a cost not exceeding £200.

No Chocolate Machines On Reading Cars.—The Tramways Committee have declined a proposal submitted by Mr. N. H Vincent for placing automatic boxes for the sale of chocolate on the tramcars.

Aldershot Tramways Order.—Application has been made for an extension of time until June 4, 1915, for the carrying out of the works authorised by the Aldershot and Farnborough Light Railway Order, 1909.

Street Widening at Cardiff.—The Tramway Committee have agreed to contribute to the cost of widening Newport Road up to the junction of City Road, which will enable the tram track to be doubled and thus obviate present delays.

Protection for Motormen at Exeter.—Methods of protecting the drivers of the cars from the weather are under consideration by the Tramways Committee. Considerable success has attended the institution of penny return fares at midday.

Medical Examination at Hull.—By a majority of 20 the Corporation have defeated a resolution for the recission of their recently-passed regulation requiring all candidates for positions on the tramways to pass a medical examination. Councillor Hargreaves, the Mayor and chairman of the Tramways Committee, pointed out that 23 of 30 of the most important undertakings had adopted rigid medical examinations before they allowed men to go on their cars.

Proposed Compulsory Mudguard.—It is stated that West Ham Council have reported favourably upon a splash guard which has been submitted to them, and that they are uniting with other authorities in London in bringing the subject before the Home Secretary with a view to a compulsory adoption of the invention by omnibus companies.

Stopping Places of Cars and Omnibuses in West Ham.—As the result of conferences held between representatives of the Tramways Committee, the omnibus companies and the police, the Commissioner has issued regulations fixing the stopping places of motor omnibuses and tramcars in that borough. The result should be a great gain in public safety.

Revenue Increased by Omnibuses.—By the running of their new omnibuses to Culter, Banchory, etc., on Sundays, the Aberdeen Suburban Tramways Company have added considerably to their tramways traffic. The omnibus passengers are conveyed to and from the starting points by the company's cars running from inside the city.

Fares on Edinburgh Motor Omnibuses.—The Tramways Committee of the Corporation hope to secure delivery of their omnibuses, which are to be worked by the Tramways Company, in time to begin the several services on July 1. In accordance with the local Act, a scale of maximum fares to be charged has been submitted to the Board of Trade for approval.

Express Parcels Delivery by Tramway Undertakings.—In reporting a revenue of £307 from the parcels service on South Shields tramways last year the manager observes that the amount was practically all profit. He adds:—"The great success attained in other towns by the introduction of an express parcels delivery would point to the desirability of the Tramway Committee considering this convenient and profitable source of revenue in the near future."

End of a "Fair" Fare System.—What is termed the "fair" fare system has been abandoned after a four years' trial on the tramways in the Smethwick and Dudley districts in favour of a return to the fares which were in operation prior to 1909. The change will mean a gain of a halfpenny to passengers on a number of twopenny stages. The track to the Blue Gates is being doubled.

Goods Traffic at Liverpool.—The Chamber of Commerce, the Dock Board, and the Corporation are co-operating to solve the problem of goods traffic on the tramways. Sir Helenus Robertson, chairman of the Dock Board, has expressed the opinion at a meeting of the Chamber of Commerce that the solution was likely to be found in motor traction. The question will be considered further at a conference of representatives of the Dock Board and the Tramways Committee of the Corporation, when the utilisation of the trams for goods traffic will be discussed.

The Bristol Tramways Purchase.—The result was announced on Monday of the poll of the ratepayers of Bristol on the question whether the Corporation should acquire the tramways undertaking of the Bristol Tramways and Carriage Company, Ltd. The result was that 18,057 votes were cast in favour of the purchase and 14,894 against, giving a majority of 3,163. The total number of electors on the register is 71,002, so that less than half of the electors took advantage of the poll. The Corporation will now proceed with their Bill to give them the statutory powers to purchase and work the tramways.

CONTRACTS AND ORDERS.

The British Thomson-Houston Company have an order from Gravesend for switchboard extensions.

Ramsbottom District Council have ordered two railless electric vehicles from the R.E.T. Construction Company.

Ferranti, Limited, have obtained an order from Wallasey Council for transformers at the new generating station, at £1,304.

Aylesbury Council have provisionally accepted the tender by Willans and Robinson for Diesel engines and plant, at £4,753.

Brimsdown Lamp Works, Limited, have secured an order from the Great Northern Railway Company for the supply of metallic filament lamps.

Sunderland Town Council have given orders to Ferranti, Limited, for transformers and meters, and to Siemens Brothers Dynamo Works for meters.

British Insulated and Helsby Cables have obtained an order for feeder cables between the power station and sub-station in connection with the electrification of the Melbourne tramways at a price which is reported to be £250,000.

Elwell-Parker Trucks.—The latest railway to join the numerous users of "Elwell-Parker" trucks is the Lancashire and Yorkshire Railway, who have just placed an order with the Railway Track Supply Company (of Great Britain), 79½, Gracechurch Street, E.C., for one of these trucks of the warehouse type.

The British Westinghouse Electric and Manufacturing Company, Limited, have secured a contract to supply the extra high-tension switchgear and also the low-tension switchgear for eleven sub-stations in connection with the electrification of the London and North Western Railway Company's suburban lines.

Manchester Tramways Committee have accepted the tender by Chambers, Scott and Co., Limited, for a rail bending machine, and the Electricity Committee have accepted the tender by Ferguson, Pallin and Company for a low tension switchboard at Stuart Street station, and by the British Insulated and Helsby Cables, W. T. Glover and Company, and Johnson and Phillips for cables.

PERSONAL.

Mr. J. T. C. Snell has been elected a member of the Royal Institution. Mr. Snell is president of the Institution of Electrical Engineers.

Mr. Raymond Asquith, son of the Prime Minister, was counsel appearing for two of the opposing parties to Newcastle Corporation Bill this week.

Mr. G. F. Cornwallis-West, who in July, 1913, resigned his seat on the board of the British Electric Traction Company, has been re-appointed a director, subject to confirmation by the stockholders.

Messrs. A. and F. Manuelle notify that they have removed to more convenient offices at Bishopsgate House, 80, Bishopsgate, E.C. Their telegraphic address will remain as at present, viz., "Feldspar, London," but their telephone number will in future be London Wall 8836.

Alderman Linsley, chairman of Salford Tramways Committee, presented a cup valued at 50 guineas, which was competed for in a five miles invitation cycle race at the sixth annual sports of the tramway employees. The trophy will become the property of the competitor winning the race three times.

An Inquiry at Oldham.—A discussion took place at the June meeting of the Council upon the dismissal of the late works manager by the Tramways Committee. At the invitation of the chairman of the committee, who agreed with the committee's action, the Corporation decided that an inquiry should be held.

Avon Rubber Company Appointments.—The Avon India Rubber Company, Limited, have appointed Mr. W. Bray (late of the Shrewsbury and Challiner Tyre Company) as their solid tire representative for Cheshire, North Wales, and part of Lancashire, and Mr. Chas. H. Holgate as their representative for Yorkshire. These appointments follow on two others recently made for the London district, viz., Mr. M. Elliot (late of the K.T. Tyre Company) and Mr. W. F. Walden (late of the Sirdar Rubber Company).

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Mr. E. Hamar, who has been appointed shift engineer at the Smethwick power station of the Birmingham and Midland Tramways Joint Committee, has been presented with a silver rose bowl by the staff at the Frindsbury power house of the Kent Electric Power Company, where Mr. Hamar has lately been engaged.

Mr. W. H. Taylor, formerly deputy electrical engineer at Walthamstow, has arrived in Perth, Western Australia, and taken up his duties as electrical superintendent of the tramways. The system is being extended under plans prepared by Messrs. Merz and McLellan, the extensions including a new power station of 9,000 kw.

Mr. A. C. L. Fell, chief officer of the London County Council tramways, at the invitation of the Home Office, attended at the recent reception by Mr. E. Griffiths, on behalf of the Home Secretary, of the deputation from the Union of Licensed Vehicles Workers against the granting of licences to youths as assistant conductors. The chief spokesman of the deputation is reported to have stated that they put their case in such a way that not only was the Under-Secretary of the Home Department impressed with their point of view, but Mr. Fell also. Judging by criticism in London local newspapers, the objections raised by this particular union are not supported by the public.

FINANCIAL REPORTS AND MEETINGS.

Havana Electric Railway, Light, and Power Company.—The dividends paid during the past year absorbed $1,680,204; profits transferred to sinking fund reserve, $92,412; and surplus carried forward, $1,221,045.

British Electric Traction Company.—At the annual meeting of the British Electric Traction Company, held in London, on Thursday, Mr. Emile Garcke, who presided, said that about 95 per cent. of their revenues of £225,000 was derived from companies associating in the British Electric Federation. The net revenue earned by all the federated companies, after paying all working expenses, amounted to £1,200,000 for the year. Of this about £800,000 was distributed in debenture interest and dividends on capital, and as much as £400,000—about a third of the total net profits—was held in reserve in one form or another by the federated companies. The profits earned by the associated companies during the past year showed a substantial increase over those of the preceding year. Of the profits distributed for the past year by the federated companies in interest and dividends the B.E.T. Company received about £200,000. The remainder went to other debenture and stockholders in the federated companies. They had formulated for the consideration of the stockholders a scheme of reduction and rearrangement of capital, but while the scheme, if adopted, would immediately give the ordinary stockholders some return on their capital, it did not contemplate any sacrifice by the preference stockholders for which they were not adequately compensated. The directors proposed to submit the scheme to a few representaitve stockholders. With regard to the general prospects of the business in the immediate future they believed that they would continue to make steady progress, notwithstanding that trade was waning and that wages and cost of materials had risen. They did not expect that they would find it necessary to reduce dividends.

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WEEKLY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 60 of the principal undertakings of the United Kingdom for the week ended June 13, give total receipts of £240,123, or £8,540 more than in the corresponding week last year. The total length of track was 2,863 miles, or 24 more than for the corresponding week. Receipts were at the rate of £83 17s. 5d. per track mile, an increase of £2 6s. as compared with the corresponding week of last year.

THE BRITISH ELECTRICAL FEDERATION.

The traffic statement for the week ended June 12, 1914, shows that the receipts from tramways and railways amounted to £40,630 as compared with £40,535 in the corresponding week last year, and from omnibuses £15,294, as compared with £7,890, making a total of £55,930, as compared with £48,425. The tramway and railway route mileage was 420.82 as compared with 428.47. Upon such of the services as were working both last year and this year the receipts show a decrease of £859 upon the week.

RAILWAYS OF THE UNITED KINGDOM.

The summary of the official traffic returns of the fifty principal railways of the United Kingdom for the week ended June 14, gives a total of £2,313,209, which was earned on 22,161 miles, being at the rate of £104 7s. 9d. per mile of line open. For the corresponding week of 1913 the receipts of the same lines amounted to £2,313,853, with 22,100 miles open, or £104 13s. 11d. per mile. There was thus a decrease of £554 in receipts, an increase of 61 in mileage, and a decrease of 6s. 2d. in receipts per mile. Thirty-six of the returns distinguish between the receipts from passenger and goods traffic, and these show an increase of £34,958 (or £1 9s. 6d. per mile) in the passenger receipts and a decrease of £34,504 (or £1 14s. 10d. per mile) in the receipts from goods traffic. The aggregate receipts of the fifty railways since the beginning of the year amounted to £52,706,679, in comparison with £53,106,203 last year, a decrease of £399,524.

COPPER AND ALUMINIUM MARKET.

June 19, 1914.

Messrs. Henry R. Merton and Co., Ltd., 2, Metal Exchange Buildings, Leadenhall Avenue, E.C., supply the following quotations of prices per ton :—

	Friday, June 19.	Last week.	A Year Ago.
	£ s. d.	£ s. d.	£ s. d.
Standard Copper (cash)	61 12 6	64 17 6	64 7 6
,, ,, (three months)	62 5 0	65 5 0	64 10 0
Electrolytic Copper—bars or ingots	64 10 0	67 10 0	69 0 0
Aluminium—bars or ingots	83 0 0	83 0 0	90 0 0

COAL MARKET.

June 19, 1914.

Messrs. Locket and Judkins, of 3, Fenchurch Avenue, E.C., report as follows :—

	Friday, June 19.	Last week.	A Year Ago.	Two Years Ago.
London, free into barge in Thames—	s. d.	s. d.	s. d.	s. d.
Best Admiralty Welsh (large)	26 0	25 6	25 0	
Best Seconds	24 6	24 0	24 0	
Ordinary Drys	21 6	22 3	20 9	
Best Washed Nuts	20 6	20 6	20 6	
Best Washed Peas	19 6	19 6	19 0	
Cardiff, f.o.b.—				
Best Admiralty (large)	22 0	21 0	20 6	17 6
Best Seconds	20 0	19 6	19 6	16 9
Ordinary Drys	17 0	17 9	16 3	15 0
Best Washed Nuts	16 0	16 0	16 0	14 6
Best Washed Peas	15 0	15 0	14 6	13 6
Newcastle, f.o.b.—				
Best Steams	14 6	14 6	15 0	13 0
Best Seconds	12 6	12 6	13 6	10 9
Smalls	8 9	8 9	8 9	9 0

No Quotations owing to transport workers' strike.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1912-3.	Latest Return. 1913-4.	Aggregate Wks.	Aggregate 1913-4.	Increase or Dec.
Anglo-Argentine	June 10	£56,386	£58,655	23	£1,295,848	+ £8,010
Auckland..... (28 days)	May 8	21,662	22,268	45	226,392	+ 5,419
Ballarat and Bendigo	April 26	4,417	4,567	4	4,567	+ 150
Brazilian St. Rly. Mirs	April	44,765	50,595	39	473,635	+ 71,209
Brazilian Traction.....	June 13	93,907	96,933	24	2,269,529	+ 91,165
Brisbane.....	May	25,560	29,850	21	140,385	+ 14,395
British Columbia .....$	April	706,633	698,508	43	7,450,590	+ 341,056
Buenos Aires Pt. & City	April	6,659	6,428	17	29,804	+ 3,418
Buenos Aires Lacroze	May	45,274	44,890	48	490,428	+ 5,927
Calcutta.....Rs	June 13	59 442	65,424	23	16,06,040	+ 93 244
Cape Town	April	12,175	13,408	17	55,388	+ 3,926
Carthagena & Herreria	May	2,051	2,202	22	12,391	— 2,782
Cordoba	March	12,688	13,499	52	159,207	+ 13,593
East India	May	1,867	1,885	43	19,124	+ 735
Kalgoorlie.....	May	3,059	3,025	22	12,830	— 1,542
La Plata.....	May	5,130	4,727	21	24,683	— 2,042
Lima.....	April	33,989	34,200	17	140,583	+ 5,910
Lisbon ..... Mirs.	March	...	160,592	...	...	...
Madras (14 days) Rs	June 15	24 344	28,060	23	317,984	+ 25,375
Manaos	May	12,877	10,199	4	10,199	— 2,678
Melbourne	April	65,500	65,000	17	262,500	+ 500
Mexico .....$	April	581,558	594,988	17	2,345,807	+ 264,842
Montevideo.....	May	29,831	29,016	31	229,192	— 401
Para	May	25,924	22,165	26	129,709	— 26,031
Port Elizabeth.....	April	4,357	8,758	17	16,634	+ 245
Puebla ..... $	May	61 400	65 300	22	328,800	+ 35,100
Rangoon	May	5 206	5,523	21	27,337	+ 792
Shanghai .....$	June 10	25 130	26,400	23	564,600	+ 93,526
Singapore .....$	June 13	12,878	11,927	23	287,772	+ 8,720
Toronto .....$	April	760,676	830,299	17	3,292,255	+ 263,847
Winnipeg.....$	April	323,563	337,414	17	1,418,875	+ 94,366

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1913-4.	Increase or Dec.
Aberdeen Corporation..	June 10	£2,454	£2,390	— £64	1½	£2,580	+ £126
Accrington Corp.....	,, 10	579	599	+ 20	10	6,145	+ 357
Ayr Corporation	,, 13	359	402	+ 43	4	1,503	+ 193
Bath Electric	,, 10	1,202	1,115	— 87	23	20,230	+ 1,434
Birkenhead Corp.	,, 14	1,307	1,259	— 48	10½	13,581	+ 141
Birmingham Corp.	,, 13	11,436	12,599	+ 1,163	11	135,778	+ 11,206
Blackburn Corporation	,, 10	1,294	1,197	— 97	11	15,302	+ 1,372
Blackpool Corporation	,, 11	1,099	2,278	+ 1,179	11	16,238	+ 3,170
Bolton Corporation	,, 14	2,880	2,979	+ 99	11	31,383	+ 1,901
Bournemouth Corp.....	,, 17	2 045	2,098	+ 53	11	23,772	+ 1,614
Bradford Corporation..	,, 18	6 216	6,292	+ 76	11	69,043	+ 4,597
Brighton Corporation..	,, 14	1.064	1,101	+ 37	10½	11,746	+ 1,080
Bristol	,, 12	7,867	8,855	+ 988	23½	190,176	+ 18,260
British Elec. Federatn.	,, 12	48,425	55,930	*	...	...	...
Burnley Corporation ..	,, 13	1,626	1,609	— 17	11	19,020	+ 818
Burton-on-Trent Corp.	,, 14	318	304	— 14	11	3,266	+ 168
Bury Corporation.....	,, 14	1,417	1,475	+ 58	10½	15,358	+ 498
Cardiff Corporation.....	May 30	2,652	2,679	+ 27	8	24,330	+ 1,291
Chatham and District..	June 11	919	881	— 38	23	20,380	+ 275
Chesterfield Corp.	,, 11	246	251	+ 5	10	3,001	+ 383
Colne Corporation	,, 13	297	279	— 18	...	...	...
Cork Electric.....	,, 11	515	499	— 16	23	11 089	+ 216
Croydon Corporation ..	,, 5	1,758	2,220	+ 462	9	17,428	+ 1,448
Darlington Corporation	,, 6	258	290	+ 32	10	2,605	+ 146
Derby Corporation	,, 13	1,002	1,021	+ 19	10½	11,219	+ 656
Dover Corporation	,, 13	210	224	+ 14	11	2.670	+ 110
Dublin & Lucan	,, 12	168	141	— 27	23	3,099	— 26
Dublin United	,, 12	6.078	5,942	— 136	24	130,246	— 3,310
Dundee City	,, 10	1,298	1,331	+ 33	3½	4,463	+ 74
East Ham Corporation	,, 13	965	1,128	+ 173	10½	11 327	+ 324
Exeter Corporation	,, 12	348	352	+ 4	11	3,859	+ 339
Gearless Motor 'Buses.	,, 13	...	490	...	24	11.121	...
Glasgow Corporation ..	,, 13	20,845	21,824	+ 979	2	41,791	+ 4,690
Glossop(U.Elec.Supply)	,, 13	129	127	— 2	24	2 948	— 69
Halifax Corporation ..	,, 9	2,054	2,165	+ 111	10	22,855	+ 1,527
Hastings & District.....	,, 10	879	985	+ 106	23	19,827	+ 232
Huddersfield Corp.	,, 13	2,127	2,348	+ 221	11	25,779	+ 678
Hull Corporation	,, 13	3,080	3,084	+ 4	11	33,562	+ 446
Ilford U.D.C.	,, 13	450	539	+ 89	10	5,523	+ 631
Ilkeston Corporation ...	,, 17	142	131	— 11	11	1,483	— 7
Ipswich Corporation ..	,, 13	452	464	+ 12	11	5,065	+ 474
Isle of Thanet	,, 13	740	709	— 31	37	15,161	+ 811
Kilmarnock Corp.	,, 6	167	167	Nil	3	578	— 40
Lanarkshire	,, 11	1,729	1,912	+ 183	23	43,750	+ 5,850
Lancashire United	,, 10	1,494	1,766	+ 272	23	37,561	+ 4,382
Leeds City	,, 13	8,298	8,567	+ 269	11	92,316	+ 4,504
Leicester Corporation..	,, 18	1,882	2,962	+ 80	24	68,228	+ 3,696
Leith Corporation	,, 13	725	743	+ 18	4	3,189	+ 130
Leyton U.D.C.	,, 11	1,343	1,387	+ 44	10	14 314	+ 816
Liverpool Corporation..	,, 13	13.061	13,312	+ 251	23½	306.038	+ 15.065
Llandudno &Colwyn B.	,, 12	331	415	+ 84	28	6.117	+ 54
London County Council	,, 10	41,996	42,788	+ 792	10	450,168	+ 22,319
London Gnl. Omnibus..	,, 13	67,716	68,677	+ 961	24	1,459,556	+ 30 771
London United	,, 12	6 520	6,138	— 382	24	142 594	+ 3,677
Lowestoft Corporation	,, 13	184	206	+ 22	36	6,732	+ 764
Maidstone Corporation	,, 11	193	187	— 9	11	2 299	+ 182
Manchester Corp.....	,, 13	17.786	17,780	— 6	11	192,209	+ 5.760
Met. Elec. Trys.	,, 12	9,306	9,383	+ 77	24	212,626	+ 4,956
Nat. Steam Car Co., Ld.	,, 14	3,199	4,926	+ 1,727	32	132.842	+ 56,113
Nelson Corporation.....	,, 6	210	231	+ 21	9½	2,163	+ 127
N'castle-on-Tyne Corp.	,, 13	4,747	5,130	+ 383	11	55,446	+ 5,595
Newport (Mon.) Corp....	,, 13	742	834	+ 92	11	9,053	+ 1,091
New St. Helens & Dist...	,, 10	857	821	— 36	50	41,006	+ 3,334
Northampton Corp	,, 15	576	572	— 4	10½	6 314	+ 253
Nottingham Corp.	,, 11	3,343	3,376	+ 33	10½	36.106	+ 1,222
Oldham Corporation ..	,, 14	2,279	2,487	+ 208	12	27,436	+ 2,038
Portsmouth Corp.....	,, 13	2,177	2,835	+ 658	11	25,722	...
Preston Corporation ...	,, 10	852	823	— 29	11	9,910	+ 318
Provincial	,, 13	1,874	2,026	+ 152	36	66.081	+ 4,004
Reading Corporation ...	,, 11	674	696	+ 22	10	7 500	+ 622
Rhondda.....	,, 11	1,144	1,279	+ 135	23	24,664	+ 1,754
Rochdale Corporation	,, 13	1,597	1,638	+ 41	11	17,890	+ 752
Rotherham Corp.....	,, 17	991	1,007	+ 16	11	11,294	+ 556
Salford Corporation ...	,, 15	5,438	5,302	— 136	11	57 576	+ 895
Sheffield Corporation...	,, 14	7,500	7,580	+ 80	11½	89,324	+ 3 928
Southampton Corp.....	,, 10	1,263	1,357	+ 94	10	13.824	+ 842
Southend-on-Sea Corp.	,, 10	868	1,016	+ 148	11	10.147	+ 1,948
South Met. Trys.	,, 12	891	1,128	+ 237	24	25,635	+ 6,917
South Shields Corp.....	,, 13	688	762	+ 74	10½	8,263	+ 1,095
Sunderland Corp.....	,, 14	1.451	1.510	+ 59	11	15,880	+ 909
Sunderland District ...	,, 10	546	559	+ 13	32	18 639	+ 1,679
Swindon Corporation ...	,, 10	172	174	+ 2	10	1 826	+ 192
Torquay	,, 11	555	603	+ 48	23	11 717	+ 367
Trys. (M.E.T.) 'Buses	,, 13	4.676	9,477	+ 4,801	24	207,971	...
TynesideTrys.&Tmrds.	,, 10	509	522	+ 13	10	12,225	+ 798
Wallasey Corporation ..	,, 13	1,213	1,302	+ 89	10½	13 924	+ 1,109
Walsall Corporation ...	,, 13	592	594	+ 2	24	14.870	+ 330
Walthamstow U.D.C....	,, 13	729	804	+ 75	11	8,998	+ 1,111
Warrington Corp	,, 4	457	471	+ 14	9	4,118	— 39
West Ham Corporation	,, 11	2,727	2,767	+ 40	10	29,960	+ 1,513
Wigan Corporation	,, 11	1,459	1,427	— 32	10	15,998	+ 683
Wolverhampton Corp ..	,, 17	1,077	1,070	— 7	12	12,577	+ 523
Yorkshire (W. Riding)	,, 14	1,455	1,401	— 54	24	34,948	+ 1,185

* From such of the services as were working both last year and this year the receipts show a decrease of £859 upon the week.

ELECTRIC RAILWAY TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1913.	1914.	Incr. or Dec.	Aggregate. Wks.	1914.	Increase or Dec.
Central London.....	June 13	£4,630	£4,978	+ £348	24	£120,737	— £2,726
City and South London	,, 13	2,606	2,566	— 40	24	65,287	- 4,220
Liverpool Overhead.....	,, 14	1,732	1,646	— 86	24	40,863	+ 1,559
London Electric.....	,, 13	13.405	13,725	+ 320	24	342,840	+ 2,690
Mersey	,, 13	2,220	2.240	+ 20	24	54,170	+ 345
Metropolitan	,, 14	17.840	19,573	+ 1,733	24	484,818	+ 37,792
Metropolitan District...	,, 13	13.169	13,112	— 57	24	315,916	+ 1,186

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TRAMWAY AND OMNIBUS SHARE LIST.

Paid.		On Week	Quotations, June 18.
...	Alabama Trac. Ltg. Power Co. 5% 1st Mt. Gd. Bds.	...	69½ — 71½
5	Anglo-Argentine Trams. Co., Lim., 5½% Cum. 1st Pref.	...	4⅛ — 5
5	Do. 5½% Cum. 2nd Pref.	...	4⅛ — 4⅜
100	Do. 4% Deb. Stk. Red.....	...	93 — 95
100	Do. 4½% Deb. Stk. Red.....	...	96½ — 101½
100	Do. 5% Deb. Stk. Red.....	...	94½ — 96½
100	Auckland Elec. Trams Co. Ld. 5% 1st Mt. Db. Stk. Red	...	103 —106
1	Bath Electric Tramways, Lim. Pref. Ord	...	⅛ — ⅜
1	Do. 5% Cum. Pref	...	⅛ — ¼
100	Do. 4½% 1st. Mort. Deb. Stock, Red.....	...	70 — 75
100	Birmingham Dis. Pwr. & Trac. Co. Ld. 4½% 1st Db. Stk.	...	84½ — 86½
10	Blackpool and Fleetwood Tramroad Co.	...	14⅜ — 15
	Bombay Elec. Supply and Trams. Co., Ord.....	...	14 — 15
10	Do. do. 6% Cum. Pref.....	...	11 — 11¼
100	Do. do. 4½% Db. Stk Rd.	...	93 — 97
$100	Brazilian Traction Light and Power Co. Lim.....	+ ½	79½ — 81½
5	Brisbane Elec. Trams. Investment Co., Ltd., Ord.	+ ⅛	6⅞ — 7⅛
5	Do. do. 5% Cum. Pref	...	4¾ — 5¼
100	Do. do. 4½% 1st Deb Stock, Red. ..	...	100 —102
10	Bristol Tramways and Carriage Co.	...	6¾ — 7
10	Do. do. 4% Cum. Pref.	...	6⅞ — 7⅛
100	Do. do. 4% Deb. Stock	...	100 —102
100	Do. do. 4½% Deb. Stock	...	95 — 97
100	British Columbia Elec. Rly. Co., Lim., Def. Ord. Stck.	— 1	109 —113
100	Do. Pref. Ord. Stock	...	103 —107
100	Do. 5% Cum. Perpetual Pref. Stock.....	...	104 —107
100	Do. 4½% 1st Mort. Debs.	+ 1	98 —101
40	Do. 4½% Vancouver Power Debs.....	...	94 — 98
100	Do. 4½% Perpetual Cons. Deb Stk.	+ ½	95 — 97
100	British Elec. Traction Co., Lim.. 6% Cum. Pref.....	...	88½ — 91½
100	Do. 7% Non-Cum. Pref.	...	56 — 59
10	Do. 6% Pref. Ord. Non-Cum.	...	13½ — 15½
100	Do. Deferred Ord. Stock	...	6 — 8
100	Do. 5% Perpetual Debenture Stock.....	...	92½ — 94½
100	Do. 4½% Second Debenture Stock, Rec	...	77 — 80
100	B. Aires Port & City Trms. 6% 1st Deb. Stk. Red.	...	73 — 78
100	Buenos Ayres Lacrose Trams. Co., Stg. 5% 1st Mrt. Deb.	+ ½	100 —102
5	Calcutta Tramways Co., Limited, Ord.	...	6½ — 7
5	Do do. 5% Cum. Pref.	...	5 — 5¼
100	Do. do. 4½% 1st Deb. Stock, Red.	...	98 —101
1	Cape Electric Tramways, Ld., ...	...	¾ — ⅞
10	Carthagena and Herrerias Steam Tramways Co., Lim.	...	2¾ — 3⅛
100	Do. 5% Debs.. Red.	...	88 — 91
5	City of Buenos Ayres Trams. Co (1904), Lim.	...	5⅛ — 5⅞
100	Do. 4% Debenture Stock Red, 1985	...	98 — 98
100	Colombo Elec. Trys. and Ltg. Co. 5% 1st Mort. Deb. ...	...	91 — 95
100	Companhia Ferro Carril do Jardim Botanico, 5% 1st Mt.	+ ½	93 — 96
10	Cork Electric Tramways and Lighting Co. 5% Cum. Pref.	...	— 6⅞
10	Dublin United Trams. Co. (1896) Lim. Ord.	+ ½	— 10¾
10	Do. do. 6% Pref.	+ ½	— 12¼
100	Do. do. "A" Red.	+ ¾	— 81
100	Do. do. Deb. Stock "B" Red. ...	...	— 80
10	Gateshead & Dist Trys. Co., Ord.	...	8½ — 9
10/-	Hastings & Dist. Electric Trams. Co., Ld., Ord.	...	⅜ — ½
1	Do. do. 6% Cum. Pref.	...	⅜ — ½
100	Do. do 4½% Deb. Stk. Red.	...	65 — 70
$1,000	Havana Electric Railway, Con. Mort. 5% Bonds	...	93½ — 97½
100	Hong Kong, Tramways Co., 5% Mort. Bds. (Regd.).....	...	83½ — 87½
10	Imperial Tramways, Ord.	...	3 — 3½
10	Do. do. 6% Cum. Pref.....	...	6¼ — 6¾
100	Do. do. 4½% Deb. Stock	...	74 — 76
5	Isle of Thanet Elec. Trams. & Ltg. Co., 5% Cum. Pref....	...	2 — 2½
100	Do. 4% Debenture Stock	...	73 — 78
1	Kalgoorlie Elec. Trams., Ltd.	...	...
100	Do. do. 5% "A" Deb. Stk.	...	82 — 87
100	Do. do. 6% "B" Do.	...	10 — 20
7/6	La Plata Elec. Trys. Co., Lim., 6% Cum. Pref.....	...	⅝ — ¾
10	Lanarkshire Tramways Co.	...	9½ — 10¾
100	Lancashire United Tramways, 5% Prior Lien Deb.	...	87 — 89
1	Lisbon Electric Trams., Lim., Ord.....	...	1⅛ — 1⅜
1	Do. 6% Cum. Pref.	...	⅛ — 1⅞
100	Do. 5% Mort. Debs.	...	95 — 100
1	London and Suburban Trac. Co., Lim., Ord.	...	⅝ — ¾
100	London General Omnibus Company, Limited, 4½% Deb.	+ ½	100½ — 102½
100	Do. Do. 5% Cum, Inc. Deb. Stk. Red.	...	88 — 91
100	London United Trms.(1901) Ltd., 4% 1st Mt. Deb. Stk. Red	...	86 — 90
100	Madras Electric Trams. (1904) Lim., 6% Cum. Pref.....	...	4⅞ — 5¼
5	Do. do. 5% Deb. Stk., Red.	...	101 —103
100	Manaos Trys. & Ltg. Co., 5% 1st Debs., Red.	...	78 — 81
$100	Manila Electric R.R. and Lighting Corp. Capital Stk.	— 1	104 —107
$1.000	Do. do. 5% Bds.	...	98½ —100½
1	Mansfield and Dist. Trys. Ltd. 6% Cum. Pref.	...	⅛ — 1⅛
100	Metropolitan Elec. Trms. Ltd., 4½% Deb Stock, Red. ..	...	87 — 90
100	Do. 5% Deb. Stock, Red. ..	...	85¼ — 88½
100	Mexico Tramways Co., Common Stock	— 1	71 — 75
500	Do. Gen. Con. 1st Mort. Gld. Bonds	+ 1	80 — 84
100	Do. 6% 50-yr. Mort. Bonds	...	77 — 81
...	Michigan United Railways 5% 1st Mort. Gld. Bonds ...	...	90 — 93
100	Montreal Street Railway, Sterling 4½% Debs. (1923).....	+ 1	99 —101
100	Do. 4½% Sterling Debs, (1922) ..	+ 1	98 —100
1	National Steam Car Co. Ltd.	...	⅝ — ¾
10	Oldham—Ashton and Hyde Elec. Ord.	...	6 — 6¼
10	Do. do. 5% Cum. Pref.	...	5¾ — 6½
5	Para Elec. Rlys. and Ltg. Co., Ord.	...	4 — 4½
5	Do. do. 6% Cum. Pref.	...	4 — 4½
1	Perth (W.A.) Elec. Trams., Ld., Ord.	...	...
1	Potteries Electric Traction Co., Ltd., Ord.	...	⅛ — ⅜
1	Do. 5% Cum. Pref.	...	⅛ — ⅜
130	Do. 4½% Debenture Stock, Red.	...	81½ — 84½
1	Provincial Tramways, Lim., Ord.	...	⅛ — ⅜
10	Do. 5% 1st Deb. Stock	...	98 —103
...	Puebla Tramway, Light & Power Co., Prior Lien 5%..	— 2	71 — 76
5	Rangoon Elec. Trams. & Supply Co., 6% Cum. Pref.....	...	5 — 5½
100	Do. do. 4½% 1st Mt. Db. Stk	...	95 — 97
100	Rhondda Tramways Co., 5% 1st. Mt. Debs.	...	87 — 89
$500	Rio de Janeiro Trys. Lgt & Pr. Co. 1st Mt. 30 yr, 5% Gd. Bds.	+ 1½	100 —102
100	Do. do. 5% 50-yr. Mort. Gold Bonds	+ 1	90 — 92
$500	Sao Paulo Tr. Light & Power, Co. 5% 1st Mort. Debs., 1929	+ 1	96 —100
100	Do. do. 5% Perp. Cons. Debs....	+ 1	98 —101
10	Shanghai Elec. Construction Co.	...	13½ — 13⅝
100	Singapore Elec. Tramways Lim., 5% Debs. Red	...	88 — 92
	South Met. Elec. Trams. and Ltg. Co., 6% Cum. Pref. ...	...	...
100	Do. do. 4% Deb. Stk.....	...	66 — 70
...	Southern Elec. Trys. Co. of B.A., 5% 1st Mrt. Debs.	...	95 — 97
100	Toronto Railway Co., 1st Mt. 4½% Sterling Bonds	...	97 — 99
100	Toronto Suburban Rly. Co., 4½% 1st Mort. Deb. Stock	...	80 — 82
100	Tramways (M.E.T.) Omnibus Co., 4½% Gtd. Deb. Stk.	...	90 — 92
5	United Elec. Tramways of Monte Video, Ord.....	...	4½ — 5⅛
5	Do. do. 6% Cum. Pref.	...	4⅞ — 5⅜
100	Do. do. 5% 1st Deb. Stk. Red.	...	92 — 95
100	Winnipeg Elec. Rly. Co. 4½% Perp. Cons. Deb.	...	93½ — 96½
5	Yorkshire (West Riding) Elec. Trys. Co., Ord.	...	¾ — ⅞
5	Do. do. 6% Cum. Pref.....	— ⅛	4¼ — 4⅞
100	Do. do. 4½% 1st Deb. Stock. Red.....	...	86 — 88

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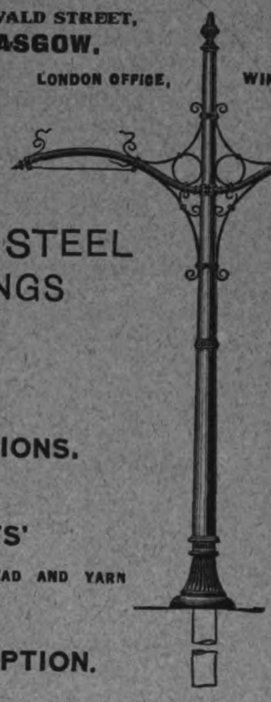

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THE LATEST PARTICULARS

of Municipal Tramway Accounts will be found in the records published in the Illustrated Issues of

THE TRAMWAY AND RAILWAY WORLD.

The capital and working reports are clearly and systematically arranged so that any required fact can be readily ascertained, while comparisons of results of the different systems can be easily made.

The Tramways are divided into two classes :—

1. With generating stations providing current for both lighting and traction purposes.
2. With separate generating stations for traction.

Particulars are given under the following heads :—

Capital Account :—
Borrowing Powers.
Borrowing Powers Exercised.
Unexhausted Borrowing Powers.
Capital Expenditure per mile of Single Track.
Loans Outstanding.
Sinking Fund and Loans Repaid.
Depreciation, Renewal and Reserve Funds.

Gross Profit on Working.

Working Expenses
Traffic.
General.
Repairs and Maintenance.
Power.
Total.

Gross Receipts :—
Traffic.
Other Revenue.
Total.

Deductions from Gross Profit :—
Interest.
Sinking Fund.
Income Tax.
Depreciation and Renewals.
Sundries.
Total.

Net Surplus or Deficit.

Appropriation of Net Surplus :—
Carried Forward.
Reserve.
Relief of Rates.

Percentage of Operating Expenses To Total Revenue.

Receipts per Car Mile :—
Average Total per Car Mile.
Average Traffic Total per Car Mile.

Operating Expenses per Car Mile :—
Traffic.
General.
Repairs and Maintenance.
Power.
Total.

Average Operating Expenses per Car Mile (excluding Power Cost).

Board of Trade Units —
No. of Units used.
Cost per Unit.
Units used per Car Mile.

Traffic Records :—
Population served.
Car Mileage.
Passengers Carried.
Passengers carried per Car Mile.
Average Fare per passenger.
Average Journeys per head of population served per annum.
Average Car Miles per Day per Car.
Traffic Revenue per Mile of Single Track.
Average Traffic Revenue per annum per head of population served
Operating expenses per passenger.
Average distance of 1d. fare.
Average fare charged per mile.
Average speed per hour.
Average Car hours per day.
Average number of Cars in use daily.
Number of cars in stock.

Telegraphic Addresses and Telephone Numbers

Of Advertisers whose Announcements appear in the Illustrated Issues of THE TRAMWAY AND RAILWAY WORLD.

NAME OF COMPANY OR FIRM.	ADDRESS.	TELEGRAPHIC ADDRESS.	TELEPHONE No.
Ackley Brake Co.	50, Church Street, New York City, U.S.A.	Acklebrak, New York	—
Ailsa Oilskin & Rubber Co.	Dairy, Ayrshire	Ailen, Dairy, Ayrshire	—
Allen & Co., Ltd., Edgar	Imperial Steel Works, Tinsley, Sheffield	Allen, Sheffield	917, 365, Sheffield.
Allen & Co., Ltd., Edgar (Tramway Dept.)	Imperial Steel Works, Tinsley, Sheffield	Askham, Sheffield (Tramway and Machinery)	213, Sheffield.
American Commerce Co., Ltd.	19, St. Bride Street, London, E.C.	Amcomco London	1508, Holborn.
Anger Manufacturing and Supply Co., Ltd.	Bank Chambers, Preston, Lancs.	Brakjuster, Preston	1033, Preston.
Anglo Engraving Co., Ltd.	Milford Lane, Strand, London, W.C.	Operameter, London	117, 8, 9, Gerrard.
Armstrong, Stevens & Son, Ltd.	Whittall Street, Birmingham	Armstrongs, Birmingham	588, Birmingham.
Auto-Ticket Printing Co., Ltd.	41, Wapping, Liverpool	Extension, Liverpool	4646, Bank, Liverpool.
Aveling & Co. (B'ham), Ltd., T. C.	91-3, New Canal Street, Birmingham	Aveling, Birmingham	2929, Birmingham.
Avon India Rubber Co., Ltd.	Melksham, Wilts	Rubber, Melksham	2, Melksham.
Babcock & Wilcox, Ltd.	80, Farringdon Street, London, E.C.	Babcock, London	6470 City (8 lines).
Bayliss, Jones & Bayliss, Ltd.	Victoria Works, Monmore Green, Wolverhampton	Bayliss, Wolverhampton	45, Wolverhampton.
Belliss & Morcom, Ltd.	Ledsam Street Works, Birmingham	Belliss, Birmingham	4480, Birmingham.
Bell Punch & Printing Co., Ltd.	53-58, Tabernacle Street, London, E.C.	Osmic, London	7531, Central.
Boydell & Sons, Ltd., W.	Brown Street Ironworks, Leigh, Lancs.	Boydell, Ironfounders, Leigh	103, Leigh
Brecknell, Munro & Rogers, Ltd.	Thrissell Street, Bristol	Brecknell, Bristol	3137 & 3138, Bristol.
Bridgeport Brass Co.	Broadway and Murray Street, New York, U.S.A.	—	—
Brill Co., J. G.	110, Cannon Street, London, E.C.	Axles, London	6018, Bank.
British Ackley Brake and Supply Co., Ltd.	Westinghouse Building, Norfolk Street, London, W.C.	Acklebrusa, London	3272, Gerrard.
British Aluminium Co., Ltd.	109, Queen Victoria Street, London, E.C.	Cryolite, London	3676, City (3 lines).
British Berna Motor Lorries, Ltd.	Avonmore Road, West Kensington, London, W.	Klibergar, London	4542, Western.
British Insulated & Helsby Cables, Ltd.	Prescot, Lancs	Insulator, Prescot	8, Prescot.
British Thomson Houston Co., Ltd.	Rugby	Asteroidal, Rugby	54, Rugby. 135, London Wall.
British Westinghouse Electric & Mfg. Co., Ltd.	Westinghouse Building, Norfolk Street, London, W.C.	Multiphase, London	2361 & 2476, Gerrard.
Brockhouse & Co., Ltd.	Victoria Works, Hill Top, West Bromwich	Brockhouse, West Bromwich	228, West Bromwich.
Brush Electrical Engineering Co., Ltd.	Falcon Works, Loughborough	Falcon, Loughborough	634, Loughborough.
Butcher & Co., J. H.	506, Moseley Road, Birmingham	Solito, Birmingham	383, South, Birmingham.
"Cedes" Electric Traction, Ltd.	112, Great Portland Street, London, W.	Cedesmixte, Wesdo, London	6130 Mayfair.
Clay & Atkinson	Bower Street, Bradford	—	1263, Bradford.
Clayton & Co. (Huddersfield), Ltd.	Union Works, Huddersfield	Karriakar, Huddersfield	1441, 2, 3, Huddersfield.
Clough, Smith & Co., Ltd.	Spencer House, South Place, London, E.C.	Clufmit, Ave., London	8150, City.
Connolly, Ltd., J. W. & T.	Wharfdale Road, King's Cross, London, N.	Smiddy, London	354, North.
Consolidated Accessories Co.	27, Clement's Lane, London, E.C.	Inbrake, London	8738, Central.
Continental Tyre and Rubber Co., Ltd.	Thurloe Place, London, S.W.	Pneumique, London	4340, Kensington.
Courtenay, J. W., Ltd.	Amberley House, Norfolk Street, W.C.	Tramigro, London	2948, Gerrard.
Curzon, Stuart A.	98-100, Victoria Street, London, S.W.	Curoareold, Sowest, London	2043, Regent.
Dennis & Co., W. F.	49, Queen Victoria Street, London, E.C.	Fredennis, London	343, Bank (2 lines).
Dick, Kerr & Co., Ltd.	Abohurch Yard, Cannon Street, E.C.	Dicker, London	5866, Bank (4 lines).
Docker Brothers, Ltd.	1 & 2, New Street, Bishopsgate Street, E.C.	Matured, London	2775, London Wall.
Doulton & Co., Ltd.	Lambeth Pottery, Lambeth, S.E.	Doulton, London	2260, Victoria (5 lines).
Dryers, Ltd.	53, Victoria Buildings, Manchester	Brownish, Manchester	—
Dunlop Rubber Co., Ltd.	Manor Mills, Aston, Birmingham	Elastic, Birmingham	123, East, Birmingham.

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(*Continued from page iii.*)

Telegraphic Addresses and Telephone Numbers

Of Advertisers whose Announcements appear in the Illustrated Issues of THE TRAMWAY AND RAILWAY WORLD.

Name of Company or Firm.	Address.	Telegraphic Address.	Telephone No.
Electric Construction Co., Ltd.	Dashwood House, 9, New Broad Street, E.C.	Concordance, London	[Central
Electro Mechanical Brake Co., Ltd.	Eagle Works, Moor Street, West Bromwich	Brakes, West Bromwich	2671, London Wall, and 10920
Equipment & Engineering Co.	Westinghouse Building, Norfolk Street, London, W.C.	Kharparts, London	291, West Bromwich.
Estler Bros.	South Molton Road, Victoria Docks, London, E.	Isolable, London	3272, Gerrard
			320, East.
Felten & Guilleaume, Carlswerk, A. G.	Carlswerk, Mulheim-on-Rhine	Carlswerk, Mülheimrhein	—
Ferranti, Ltd.	Central House, Kingsway, London, W.C.	Ferranti, Westcent, London	1602, Regent.
General Electric Co., Ltd.	71, Queen Victoria Street, London, E.C.	Polyphase, London	3600, London Wall.
General Seating Co., Ltd.	13, City Road, London, E.C.	Cushioning, Finsquare, Lndn.	6187, London Wall.
Glasgow Numerical Printing Co.	31, Finnieston Street, Glasgow	Tickets, Glasgow	5350, Glasgow
Glenn, J. Barber	Moorgate Station Chambers, London, E.C.	Octet, London	262, London Wall.
Green & Sons, Ltd., E.	2, Exchange Street, Manchester	Economiser, Manchester	1375, Manchester.
Grover & Co., Ltd.	St. Peter's Street, Wharf Road, City Road, N.	Adopted, London	617, North.
Hadfield's Steel Foundry Co., Ltd.	Hecla Works, Sheffield	Hadfield, Sheffield	750, 2628, & 2638, Sheffield.
Hadley's Industrial Motors, Ltd.	Yoker, Glasgow	Horseless, Glasgow	196 & 197, Clydebank, [Central
Hanley's Telegraph Works, Ltd.	13 & 14, Blomfield Street, London Wall, E.C.	Henletel, London	4940, London Wall, and 3496.
Hurst, Nelson & Co., Ltd.	Motherwell, Scotland	Nelson, Motherwell	44, Motherwell.
Imperial Brake Block Co., Ltd.	1, Central Buildings, Tothill Street, S.W.	Millimodus, Ltd., London	4189, Regent.
International Pay-as-you-enter Tram. Co., Ltd.	6, Broad Street Place, London, E.C.	Pasentecar, London	8576, Bank.
International Time Recording Co.	151-155, City Road, London, E.C.	Timefactos, London	1629, London Wall.
Kalbitum Paint Co.	Belvedere Works, Belvedere, Kent	—	—
Kearsley & Co., Ltd., Robt.	Ripon, Yorks	Kearsley, Ripon	5, Ripon.
Leyland Motors, Ltd.	Leyland, Lancs	Motors, Leyland	7, Leyland.
Lorain Steel Co.	36-38, New Broad Street, London, E.C.	Thoughtful, London	8186, London Wall.
Lubricators, Ltd.	59, Tollington Park, London, N.	Agreascup, London	1786, North.
M. and G. Truck and Engineering Co., Ltd.	St. John's House, 124-127, Minories, London, E.	Emgestock, London	729, Avenue.
Magnolia Anti-Friction Metal Co., Ltd.	49, Queen Victoria Street, London, E.C.	Magnolier, London	6596, City.
Major, Robinson & Co., Ltd.	218, Deansgate, Manchester	—	5008, Central, Manchester.
Maudslay Motor Co., Ltd.	Parkside, Coventry	Maudslay, Coventry	110, Coventry.
Metropolitan Carriage, Wagon, and Finance Co., Ltd.	Saltley, Birmingham	Metro., Birmingham	6410, Central.
Micanite & Insulators Co., Ltd.	Empire Works, Blackhorse Lane, Walthamstow, E.	Mytilite, London	38, Walthamstow.
Millars' Timber and Trading Co., Ltd.	Pinners' Hall, London, E.C.	Jarrah, London	368, London Wall.
Mines-Daimler-Mercedes, Ltd.	132, Long Acre, London, W.C.	Milnesie, London	8910, Gerrard.
Mirrlees, Watson Co., Ltd.	Scotland Street, Glasgow	Mirrlees, Glasgow	1783, South Side.
Motor Rail and Tram Car Co., Ltd.	79 Lombard Street, London, E.C.	—	1777, Avenue.
Motor Traction	20, Tudor Street, London, E.C.	Autocars, London	3848, City.
Municipal Tramways Association	C. J. Spencer, 7, Hall Ings, Bradford	Tramways, Bradford	2381 & 2382, Bradford.
National Electric Construction Co., Ltd.	3, Laurence Pountney Hill, London, E.C.	Overhauled, London	5329, Bank.
Naylor Brothers (London) Ltd.	407, Oxford Street, London, W.	Glossiest, London	926, Paddington.
Peacock Brake Co.	27, Clement's Lane, London, E.C.	Inbrake, London	5735, Central.
Pearson, Huggins & Co., Ltd.	Spencer House, South Place, London, E.C.	Tuniciers, London	92, London Wall.
Pease & Partners, Ltd.	8, Eastcheap, London, E.C.	Fossicker, London	2640, Avenue.
Peckham Truck Co.	Queen Anne's Chambers, London, S.W.	Quancham, London	2413, Victoria.
Peter Union Tyre Co.	190-192, Great Portland Street, London, W.	Pneupeter, London	2433, Gerrard.
Philipson & Co., W.	Holland Street, Astley Bridge, Bolton	Safety, Bolton	—
Pinchin, Johnson & Co., Ltd.	Minerva House, 26 & 27, Bevis Marks, London, E.C.	Pinchin, London	9916, London Wall.
Polack Tyre and Rubber Co., Ltd.	31-34, Basinghall Street, London, E.C.	Polackomp Ave., London	5725, London Wall.
R.E.T. Construction Co., Ltd	Finsbury Pavement House, London, E.C.	Raillessly, Ave., London	1384, London Wall.
Ruberoid Co., Ltd.	Meadow Works, Nottingham	Dot, Nottingham	19, Nottingham.
Russell & Sons, Ltd., James	81-83, Knightrider Street, London, E.C.	Ruberoid, London	1480, Central.
	Crown Tube Works, Wednesbury	Russell, Wednesbury	2, Wednesbury.
Scholey & Co., Ltd.,	151, Queen Victoria Street, London, S.W.	Scolanco, London	5863 & 5864, City.
Senecaut, Robert	125, Rue des Boulets, Paris	—	—
Shrewsbury & Challinor Tyre Co., Ltd.	Kay Street, Ardwick Green, Manchester	Challiner, Manchester	3800, Cntl., M'chstr, [Dalston.
Siemens Brothers Dynamo Works, Ltd.	Tyssen Street, Dalston, London, N.E.	Siemodyn, London	8387-8389, Central, and 2440,
Simplex Conduits, Ltd.	Garrison Lane, Birmingham	Economy, Birmingham	35, Victoria, Birmingham.
Simplex Rubber Co., Ltd.	Scrubbs Lane, Willesden, London, N.W.	Simplexine, London	550, Willesden.
Skefko Ball Bearing Co., Ltd.	Skefko Works, Luton	Skefko, Luton	418, Luton.
Smith & Co., Frederick	Anaconda Works, Salford, Manchester	Anaconda, Manchester	2334, Manchester.
Standard Underground Cable Co.	Dock House, Billiter Street, London, E.C.	—	5463, Avenue.
Stevens, Ltd., W. A.	26, Victoria Street, London, S.W.	Petelobus, London	4939, Victoria.
Stewarts & Lloyds, Ltd.	41, Oswald Street, Glasgow	Lapweld, Glasgow	—
Straker & Squire, Ltd., Sidney	Nelson Square, Blackfriars, London, S.E.	Straquire, London	369, Hop.
Taylor, John	7, Strand Street, Liverpool	Velo, Liverpool	4484 (Bank), Liverpool.
"The Coventry" Chain Co., Ltd.	Spon End Works, Coventry	Chains, Coventry	830, Coventry.
Thermit, Ltd.	27, Martin's Lane, Cannon Street, London, E.C.	Fulmen, Cannon, London	4293, City.
Ticket Punch and Register Co.	46, Queen Victoria Street, London, E.C.	Accompendo, London	3322, City.
Tilling, Ltd., Thomas	Winchester House, Peckham, London, S.E.	—	1209, Hop.
Titan Trackwork Co., Ltd.	Rutland Road, Sheffield	—	798, Central, Sheffield.
Todd, R. R.	334, Birkbeck Chambers, High Holborn, London, W.C.	Crossings, Sheffield	3934, City.
Tramways and Light Railways Association	Caxton House, Westminster, London, S.W.	Neptubond, London	2110, Victoria.
Tramway and Railway World	Amberley House, Norfolk Street, W.C.	—	2948, Gerrard.
Tramway Supplies, Ltd.	160, Woodhouse Lane, Leeds	Tramigro, London	3488, Central, Leeds.
Tudor Accumulator Co., Ltd.	119, Victoria Street, London, S.W.	Controllers, Leeds	2600, Victoria.
Tyne Metal Co., Ltd.	Skinnerburn Road, Newcastle-on-Tyne	Suboonical, London	2943, Newcastle.
United Electric Car Co., Ltd.	Preston, Lancs.	Floating, Newcastle-on-Tyne	219 & 220, Preston.
Valor Co., Ltd.	Rocky Lane, Aston Cross, Birmingham	Prescar, Preston	252 & 253 East, Birmingham.
Walter Scott, Ltd.	Leeds Steel Works, Leeds	Valor, Birmingham	510, Leeds.
Warner International Engineering Co., Ltd.	5, Carteret Street, Westminster, London, S.W.	Bessemer, Leeds	5102, Victoria.
Watlington & Co., Ltd.	Britannia House, 48, Milton Street, London, E.	Birail, London	1257, City.
Wells, A. C. & Co.	102-104, Midland Road, St. Pancras, London, N.W.	Astnaco, Barb, London	341, North.
Westinghouse Brake Co., Ltd.	York Road, King's Cross, London, N.	Unbreakable, London	2416, North. [Central.
White & Co., J. G.	9, Cloak Lane, Cannon Street, London, E.C.	Westinghouse, London	3306, London Wall, and 9888
Williamson, Alfred	North Mill Printing Works, Ashton-under-Lyne	Whitterick, London	320, Ashton-under-Lyne.
Wilson Rolling Shutter Co.	St. John's House, 124 to 127, Minories, London, E.	—	729, Avenue.
Winter & Co., E.	64, Cheapside, London, E.C.	Shurolter, London	985, Central.
Wiseman, Ltd., Alfred	Glover Street, Birmingham	Similative, London	99, Victoria, Birmingham.
Wolf & Co., S.	115, Southwark Street, London, S.E.	Verus, Birmingham	5172, Central, and 2734, Hop.
Worthington Pump Co., Ltd.	153, Queen Victoria Street, London, E.C.	Widerstand, London	301, 302 & 303, Bank
		Steampump, London	
Yorkshire and Lincolnshire Tar Distillation Co.	Standard Buildings, Leeds	Creosote, Leeds	4504, Central, Leeds.
Youngs	Ryland Street Works, Birmingham	Oldens, Birmingham	301, Midland.

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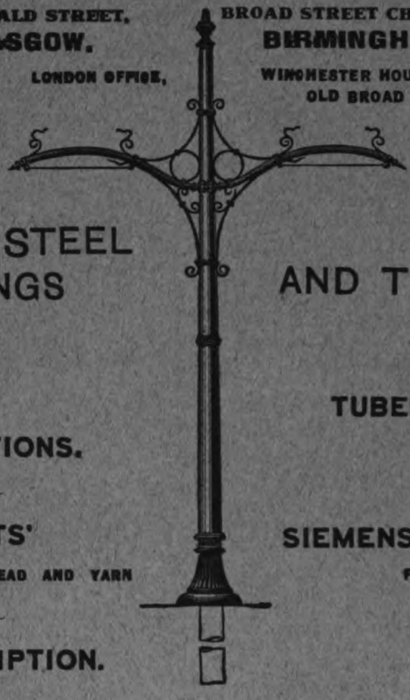

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OBSTRUCTION OF TRAMWAY TRACK: EXTRAORDINARY ATTITUDE OF THE LONDON POLICE.

APPLICATION OF BALL BEARINGS TO TRAMCARS.

PROPOSED PURCHASE OF BRISTOL TRAMWAYS.
Committee and Expert Reports.

BIRMINGHAM TRAMWAY FARES.
Report of Mr. A. Baker, General Manager.

Railless Cars, Omnibuses, and Road Maintenance. Difficulty of Private Bill Procedure.

COST OF RAILLESS TRACTION AT LEEDS AND MOTOR OMNIBUSES AT WARRINGTON.

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Telegraphic Addresses and Telephone Numbers

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NAME OF COMPANY OR FIRM.	ADDRESS.	TELEGRAPHIC ADDRESS.	TELEPHONE NO.
Ackley Brake Co.	50, Church Street, New York City, U.S.A.	Acklebrak, New York	—
Ailsa Oilskin & Rubber Co.	Ailsa Works, Dairy, Ayrshire	Ailsa, Dairy, Ayrshire	—
Albion Motor Car Co., Ltd.	Scotstoun, Glasgow, W.	Automobile, Glasgow	1991, Partick, Glasgow.
Allen & Co., Ltd., Edgar	Imperial Steel Works, Tinsley, Sheffield	Allen, Sheffield	917, 266, Sheffield.
Allen & Co., Ltd., Edgar (Tramway Dept.)	Imperial Steel Works, Tinsley, Sheffield	Askham, Sheffield (Tramway and Machinery)	213, Sheffield.
Anger Manufacturing and Supply Co., Ltd.	Bank Chambers, Preston, Lancs.	Brakjuster, Preston	1033, Preston.
Anglo Engraving Co., Ltd.	Milford Lane, Strand, London, W.C.	Operameter, Estrand, London	117, 8, 9, Gerrard.
Armstrong, Stevens & Son, Ltd.	Whittall Street, Birmingham	Armstrongs, Birmingham	6146, Birmingham.
Auto-Ticket Printing Co., Ltd.	41, Wapping, Liverpool	Extension, Liverpool	4646, Bank, Liverpool.
Aveling & Co. (B'ham), Ltd., T. C.	91-3, New Canal Street, Birmingham	Aveling, Birmingham	2989, Birmingham.
Avon India Rubber Co., Ltd.	Melksham, Wilts	Rubber, Melksham	2, Melksham.
Babcock & Wilcox, Ltd.	20, Farringdon Street, London, E.C.	Babcock, London	6470 City (3 lines).
Baker & Co. (Rotherham), Ltd., J.	Brinsworth Iron and Wheel Works, Rotherham	Brinsworth, Rotherham	89 and 435, Rotherham.
Bayliss, Jones & Bayliss, Ltd.	Victoria Works, Monmore Green, Wolverhampton	Bayliss, Wolverhampton	630, Wolverhampton.
Belliss & Morcom, Ltd.	Ledsam Street Works, Birmingham	Belliss, Birmingham	3044, Birmingham.
Bell Punch & Printing Co., Ltd.	52-58, Tabernacle Street, London, E.C.	Oamic, Finsquare, London	7331, Central.
Bentinck Motor Supply Co., Ltd.	13, Spring Gardens, Manchester	—	—
Bridgeport Brass Co.	Broadway and Murray Street, New York, U.S.A.	—	—
Brill Co., J. G.	110, Cannon Street, London, E.C.	Axles, London	6018, Bank.
British Ackley Brake and Supply Co., Ltd.	Westinghouse Building, Norfolk Street, London, W.C.	Acklebrusa, Estrand, London	3373, Gerrard.
British Aluminium Co., Ltd.	109, Queen Victoria Street, London, E.C.	Cryolite, London	2576, City (3 lines).
British Berna Motor Lorries, Ltd.	Avonmore Road, West Kensington, London, W.	Klibergar, Westkens, London	4542, Western.
British Insulated & Helsby Cables, Ltd.	Prescot, Lancs	Insulator, Prescot	8, Prescot.
British Westinghouse Electric & Mfg. Co., Ltd.	Westinghouse Building, Norfolk Street, London, W.C.	Multiphase, Estrand, London	2281 & 2476, Gerrard.
Brockhouse & Co., Ltd.	Victoria Works, Hill Top, West Bromwich	Brockhouse, West Bromwich	223, West Bromwich.
Brown and Sons (Huddersfield), Ltd., David	Park Works, Lockwood, Huddersfield	Gearing, Huddersfield	1060, Huddersfield.
Brush Electrical Engineering Co., Ltd.	Falcon Works, Loughborough	Falcon, Loughborough	634, Loughborough.
"Cedes" Electric Traction, Ltd.	112, Great Portland Street, London, W.	Cedesmixte, Wesdo, London	6130 Mayfair.
Clay & Atkinson	Bower Street, Bradford	—	1263, Bradford.
Clayton & Co. (Huddersfield), Ltd.	Union Works, Huddersfield	Karriakar, Huddersfield	1441, 2, 3, Huddersfield.
Clough, Smith & Co., Ltd.	Spencer House, South Place, London, E.C.	Clufmit, Ave., London	8150, City.
Commercial Cars, Ltd.	Biscot Road, Luton	Komerkars, Luton	192 and 193, Luton.
Consolidated Accessories Co.	27, Clement's Lane, London, E.C.	Inbrake, Cannon, London	8788, Central.
Continental Tyre and Rubber Co., Ltd.	Thurloe Place, London, S.W.	Pneumique, Southkens, Lndn	4340, Kensington.
Courtenay, J. W., Ltd.	Amberley House, Norfolk Street, W.C.	Tramigro, London	2948, Gerrard.
Curzon, Stuart A.	98-100, Victoria Street, London, S.W.	Curzamold, Sovest, London	2043, Regent.
Daimler Co., Ltd.	Daimler Works, Coventry	Daimler, Coventry	505, Coventry.
Dennis & Co., W. F.	49, Queen Victoria Street, London, E.C.	Fredennis, Cannon, London	343, Bank (2 lines)
Dennis Bros. (1913), Ltd.	Onslow Works, Guildford	Dennis, Guildford	129 and 239, Guildford.
Dick, Kerr & Co., Ltd.	Abchurch Yard, Cannon Street, E.C.	Dicker, Cannon, London	5956, Bank (4 lines).
Docker Brothers, Ltd.	170, Bishopsgate, London, E.C.	Matured, London	2775, London Wall.
Doulton & Co., Ltd.	Lambeth Pottery, Lambeth, S.E.	Doulton, London	2280, Victoria (5 lines).
Dryers, Ltd.	53, Victoria Buildings, Manchester	Brownish, Manchester	5836, City.
Dunlop Rubber Co., Ltd.	Manor Mills, Aston, Birmingham	Elastic, Birmingham	123, East, Birmingham.

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Some Countries and Colonies represented in THE PAID SUBSCRIPTION LIST OF THE TRAMWAY & RAILWAY WORLD

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NAME OF COMPANY OR FIRM.	ADDRESS.	TELEGRAPHIC ADDRESS.	TELEPHONE No.
Edison & Swan United Electric Light Co., Ltd.	Ponders End, Middlesex	Ediswan, Ponders End	520, Enfield. [Central
Electric Construction Co., Ltd.	Dashwood House, 9, New Broad Street, E.C.	Concordance, London	2671, London Wall, and 10999
Electro-Mechanical Brake Co., Ltd.	Eagle Works, West Bromwich	Brakes, West Bromwich	297, West Bromwich.
Equipment & Engineering Co.	Westinghouse Building, Norfolk Street, London, W.C.	Kharparts, Estrand, London	3373, Gerrard.
Estler Bros.	South Molton Road, Victoria Docks, London, E.	Isolable, London	330, East.
Felten & Guilleaume, Carlswerk, A. G.	Carlswerk, Mülheimrhein	Carlswerk, Mülheimrhein	—
Ferranti, Ltd.	Central House, Kingsway, London, W.C.	Ferranti, Westcent, London	1602, Regent
General Electric Co., Ltd.	71, Queen Victoria Street, London, E.C.	Polyphase, London	3600, London Wall.
General Seating Co., Ltd.	13, City Road, London, E.C.	Cushioning, Finsquare, Lndn.	6187, London Wall.
Glasgow Numerical Printing Co.	81, Finnieston Street, Glasgow	Tickets, Glasgow	5550, Glasgow
Glenn, J. Barber	Moorgate Station Chambers, London, E.C.	Octet, Ave., London	362, London Wall.
Green & Sons, Ltd., E.	2, Exchange Street, Manchester	Economiser, Manchester	1375, Manchester.
Grover & Co., Ltd.	St. Peter's Street, Wharf Road, City Road, N.	Adopted, Nordo, London	617, North.
Hadfields, Ltd.	Hecla Works, Sheffield	Hadfield, Sheffield	750, 2628, & 2632, Sheffield.
Halley's Industrial Motors, Ltd.	Yoker, Glasgow	Horseless, Glasgow	196 & 197, Clydebank.
Henley's Telegraph Works, Ltd.	13 & 14, Blomfield Street, London Wall, E.C.	Henletel, Ave., London	4560, London Wall.
Hurst, Nelson & Co., Ltd.	Motherwell, Scotland	Nelson, Motherwell	44, Motherwell.
International Pay-as-you-enter Tram. Co., Ltd.	117, Victoria Street, London, S.W.	Pasentecar, London	6512, Victoria.
International Time Recording Co.	151-155, City Road, London, E.C.	Timefactos, London	1629, London Wall.
Kearsley & Co., Ltd., Robt.	Ripon, Yorks	Kearsley, Ripon	5, Ripon.
Leyland Motors, Ltd.	Leyland, Lancs	Motors, Leyland	37, Leyland.
Lorain Steel Co.	36-38, New Broad Street, London, E.C.	Thoughtful, London	8186, London Wall.
Macintosh & Co., Ltd., Chas.	Cambridge Street, Manchester	Macintosh, Manchester	7147, Central, Manchester.
M. and G. Truck and Engineering Co., Ltd.	St. John's House, 124-127, Minories, London, E.	Emgeestock, Ald., London	729, Avenue.
Magnolia Anti-Friction Metal Co., Ltd.	49, Queen Victoria Street, London, E.C.	Magnolier, Cannon, London	6596, City.
Major, Robinson & Co., Ltd.	218, Deansgate, Manchester		5008, Central, Manchester.
Maudslay Motor Co., Ltd.	Parkside, Coventry	Maudslay, Coventry	110, Coventry.
Metropolitan Carriage, Wagon, and Finance Co., Ltd.	Saltley, Birmingham	Metro., Birmingham	6410, Central.
Micanite & Insulators Co., Ltd.	Empire Works, Blackhorse Lane, Walthamstow, E.	Mytilite, Phone, London	38, Walthamstow.
Millars' Timber and Trading Co., Ltd.	Pinners' Hall, London, E.C.	Jarrah, Stock, London	368, London Wall.
Milnes-Daimler-Mercedes, Ltd.	183, Long Acre, London, W.C.	Milnesie, Rand, London	8910, Gerrard.
Mirrlees, Watson Co., Ltd.	Scotland Street, Glasgow	Mirrlees, Glasgow	1781, South Side.
Motor Rail and Tram Car Co., Ltd.	79 Lombard Street, London, E.C.	—	1777, Avenue.
Motor Traction	20, Tudor Street, London, E.C.	Autocars, Fleet, London	2848, City.
Municipal Tramways Association	C. J. Spencer, 7, Hall Ings, Bradford	Tramways, Bradford	2381 & 2382, Bradford
National Electric Construction Co., Ltd.	3, Laurence Pountney Hill, London, E.C.	Overhauled, London	5329, Bank.
Naylor Brothers (London) Ltd.	407, Oxford Street, London, W.	Glossiest, Wesdo, London	926, Paddington.
Peacock Brake Co.	97, Clement's Lane, London, E.C.	Inbrake, Cannon, London	5735, Central.
Pease & Partners, Ltd.	Tees Ironworks, Middlesbrough	Pease, Middlesbrough	917, Middlesbrough.
Peckham Truck Co.	Queen Anne's Chambers, London, S.W.	Peckham, Quancham, London	3413, Victoria.
Peter Union Tyre Co.	190-193 Great Portland Street, London, W.	Pneupeter, Wesdo, London	2633, Gerrard.
Philipson & Co., W.	Holland Street, Astley Bridge, Bolton	Safety, Bolton	147, Eagley.
Pinchin, Johnson & Co., Ltd.	Minerva House, 26 & 27, Bevis Marks, London, E.C.	Pinchin, Ald., London	9916, London Wall.
Polack Tyre and Rubber Co., Ltd.	31-34, Basinghall Street, London, E.C.	Polackomp Ave., London	5726, London Wall.
R.E.T. Construction Co., Ltd.	Finsbury Pavement House, London, E.C.	Raillessly, Ave., London	1384, London Wall.
Railway & General Engineering Co., Ltd.	Meadow Works, Nottingham	Dot, Nottingham	19, Nottingham.
Railway Track Supply Co. of Gt. Britain	79½, Gracechurch Street, London, E.C.	Gillfrase, London	930, Bank.
Ruberoid Co., Ltd.	81-83, Knightrider Street, London, E.C.	Ruberoid, Cent., London	1498, Central.
Russell & Sons, Ltd., James	Crown Tube Works, Wednesbury	Russell, Wedpesbury	2, Wednesbury.
Scholey & Co., Ltd.	151, Queen Victoria Street, London, E.C.	Scolanco, London	5863, City.
Shrewsbury & Challiner Tyre Co., Ltd.	Kay Street, Ardwick Green, Manchester	Challiner, Manchester	962, Central, Manchester.
Siemens Brothers Dynamo Works, Ltd.	Tyssen Street, Dalston, London, N.E.	Siemodyn, Kinland, London	8387-8389, Central, and 2660, Dalston
Simplex Conduits, Ltd.	Garrison Lane, Birmingham	Economy, Birmingham	35, Victoria, Birmingham
Simplex Rubber Co., Ltd.	Scrubbs Lane, Willesden, London, N.W.	Simplexine, Kensal, London	550, Willesden.
Skefko Ball Bearing Co., Ltd.	Skefko Works, Luton	Skefko, Luton	418, Luton.
Smith & Co., Frederick	Anaconda Works, Salford, Manchester	Anaconda, Manchester	2334, Manchester.
Standard Underground Cable Co.	Dock House, Billiter Street, London, E.C.	—	5463, Avenue.
Stevens, Ltd., W. A.	26, Victoria Street, London, S.W.	Petalobus, Vic., London	4039, Victoria.
Stewarts & Lloyds, Ltd.	41, Oswald Street, Glasgow	Lapweld, Glasgow	9880, City.
Straker & Squire, Ltd., Sidney	Nelson Square, Blackfriars, London, S.E.	Rhomboidal, London	369, Hop.
Taylor, John	7, Strand Street, Liverpool	Velo, Liverpool	4484 (Bank), Liverpool.
"The Coventry" Chain Co., Ltd.	Spon End Works, Coventry	Chains, Coventry	830, Coventry.
Thermit, Ltd.	97 Martin's Lane, Cannon Street, London, E.C.	Fulmen, Cannon, London	4292, City.
Tilling, Ltd., Thomas	Winchester House, Peckham, London, S.E.	—	2814, Hop.
Titan Trackwork Co., Ltd.	Rutland Road, Sheffield	Crossings, Sheffield	798 Central, Sheffield.
Todd, R. R.	334, Birkbeck Chambers, High Holborn, London, W.C.	Neptubond, London	8854, City
Tramways and Light Railways Association	Carton House, Westminster, London, S.W.	—	2110, Victoria.
Tramway and Railway World	Amberley House, Norfolk Street, W.C.	Tramsero, London	2948, Gerrard.
Tramway Supplies, Ltd.	160, Woodhouse Lane, Leeds	Controller, Leeds	3488, Central, Leeds
Tudor Accumulator Co., Ltd.	3, Central Buildings, London, S.W.	Suboonical, London	3600, Victoria.
Tyne Metal Co., Ltd.	Skinnerburn Road, Newcastle-on-Tyne	Floating, Newcastle-on-Tyne	2943, Newcastle.
United Electric Car Co., Ltd.	Preston, Lancs.	Prescar, Preston	219 & 220, Preston.
Val de Travers Asphalte Paving Co., Ltd.	Hamilton House, Bishopsgate, London, E.C.	Traversable, Ave., London	7467, London Wall.
Valor Co., Ltd.	Rocky Lane, Aston Cross, Birmingham	Valor, Birmingham	252 & 253 East, Birmingham.
Vandervell & Co., C. A.	Warple Way, Acton Vale, London, W.	Vanteria, Act., London	1234, Chiswick.
Wakefield & Co., C. C.	Wakefield House, Cheapside, London, E.C.	Cheery, Cent., London	11305 and 13466, Central.
Walter Scott, Ltd.	Leeds Steel Works, Leeds	Bessemer, Leeds	510, Leeds.
Warner International Engineering Co., Ltd.	5, Carteret Street, Westminster, London, S.W.	Birail, Vic., London	5102, Victoria
Watlington & Co., Ltd.	Britannia House, 48, Milton Street, London, E.C.	Aetnaco, Barb., London	1257, City (3 lines).
Waygood & Co., Ltd., R.	Falmouth Road, London, S.E.	Waygood, Sedist, London	4000, Hop.
Wells, A. C. & Co.	103-104, Midland Road, St. Pancras, London, N.W.	Unbreakable, Kincross, Lndn	341, North.
Westinghouse Brake Co., Ltd.	York Road, King's Cross, London, N.	Westinghouse, Kincross, Lndn	2416, North. [Central
White & Co., J. G.	9, Cloak Lane, Cannon Street, London, E.C.	Whitterick, Cannon, London	3306, London Wall, and 9686
Williamson, Alfred	North Mill Printing Works, Ashton-under-Lyne	—	330, Ashton-under-Lyne.
Winby & Co., L. P.	13 and 14, Abchurch Lane, London, E.C.	Winby, London	3198, City.
Wiseman, Ltd., Alfred	Glover Street, Birmingham	Verus, Birmingham	99, Victoria, Birmingham.
Wolf & Co., S.	115, Southwark Street, London, S.E.	Widerstand, London	5173, Central, and 2734, Hop.
Worthington Pump Co., Ltd.	153, Queen Victoria Street, London, E.C.	Pumping, London	301, 302 & 303, Bank
Yarwood & Co., Ltd., John	Bramber Rd., North End Rd., Fulham, London, S.W.	Bernotor, Weskkens, London	4211, Kensington.
Youngs	Ryland Street Works, Birmingham	Oldens, Birmingham	301, Midland.

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